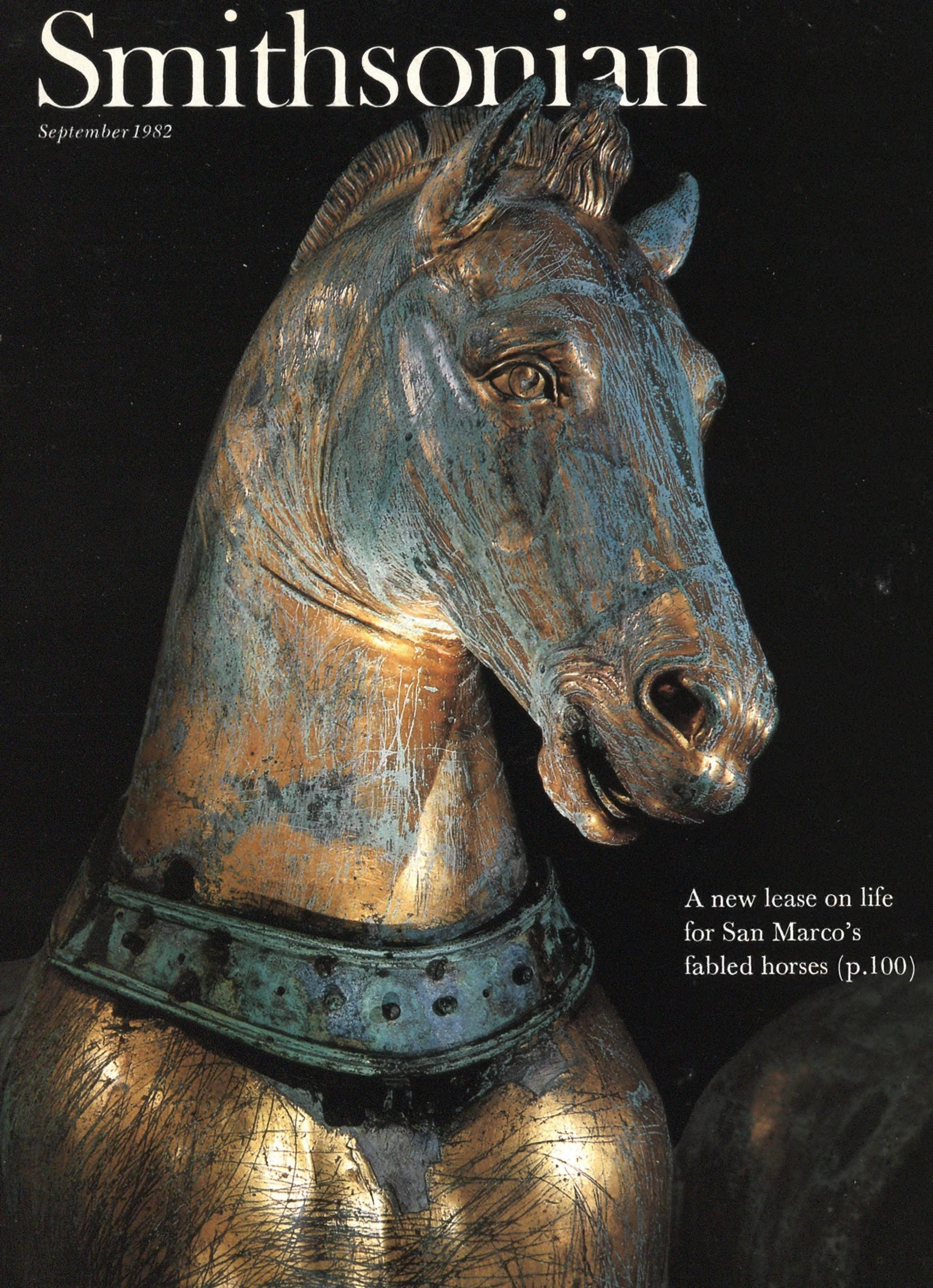
Smithsonian

September 1982



A new lease on life
for San Marco's
fabled horses (p.100)

A BLENDING OF ART AND MACHINE

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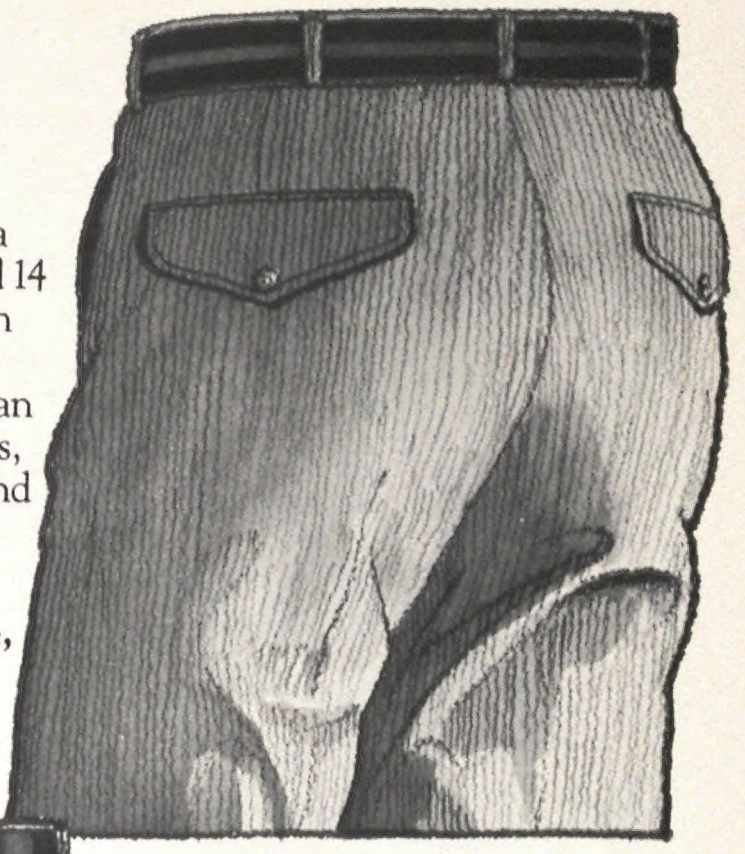

The Lands' End position in corduroy began with an unmistakable, long-term, in-house commitment.

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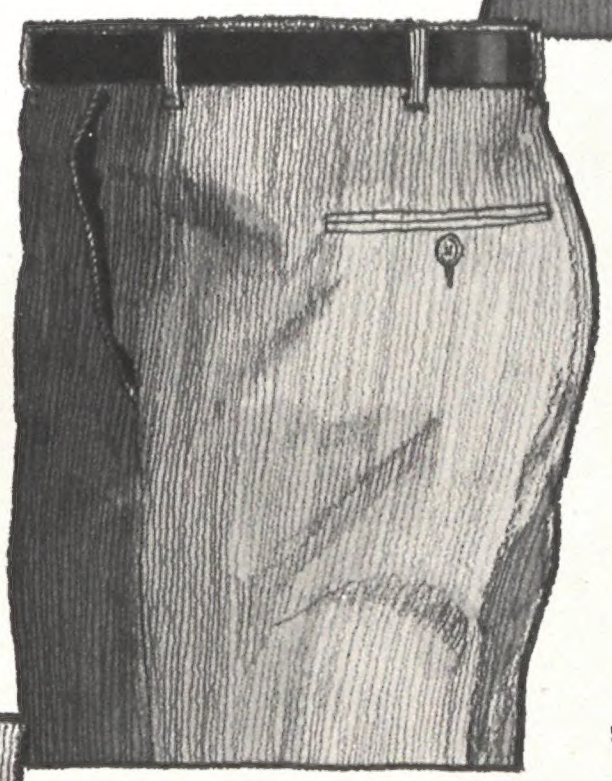
For a full spell-out of what's available, we refer you to our catalog. But, keep an eye out for some of our sturdy models, including a comfortable elastic-back corduroy casual pant and a pant with a classic Western cut.



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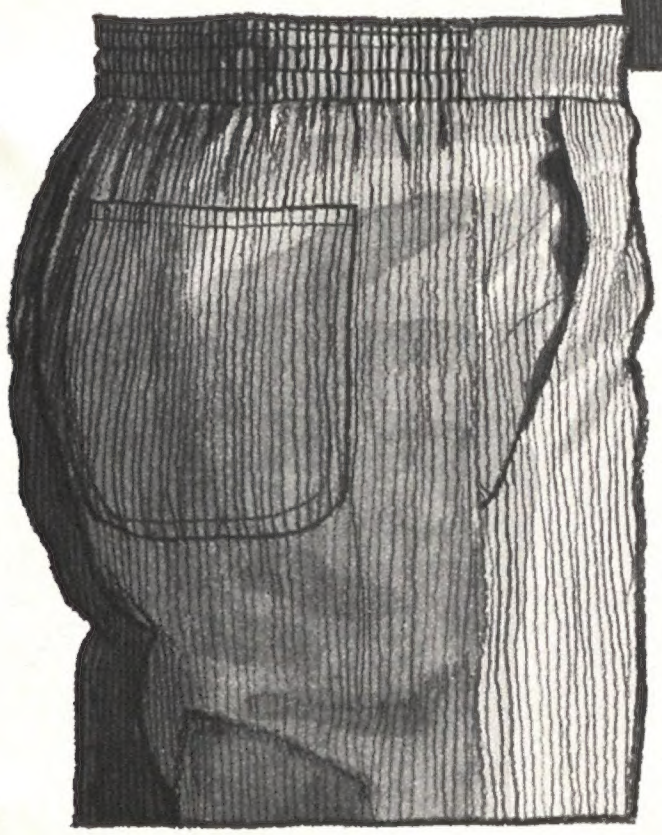

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September 1982

Smithsonian

Volume 13, Number 6

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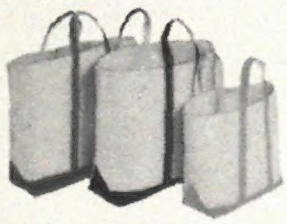

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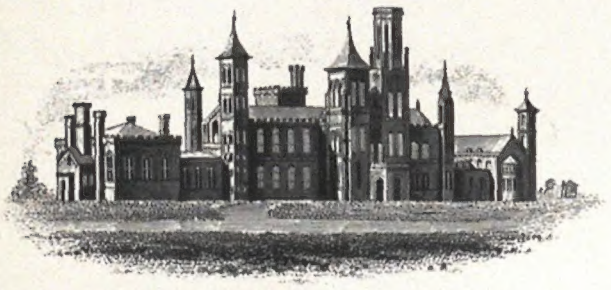

We need to know more about the mysteries of volcanism. Smithsonian involvement with a recent eruption added to our knowledge

Most of the world's active volcanoes—though by no means all—are situated in geographically remote areas, far away from urban centers or places equipped with high-speed communications. At these points the Earth's surface seems most closely linked to the vast and angry bowels that lie beneath us, areas of continuing dynamism that have enriched our natural history by providing many of the resources upon which our world depends. As our knowledge of volcanism increases, so will we understand more about natural resources and world climates.

Curiously, field scientists—while studying seismic activity, the structure of the materials thrown out from volcanic vents, or the mechanism of the eruption itself—do not often interact with those who are working in space or atmospheric science. So it was most fortunate that the Smithsonian's Scientific Event Alert Network (SEAN) learned swiftly that an active volcano, Soufrière, had begun to erupt on the island of St. Vincent in the Lesser Antilles in April 1979. SEAN has several times proved its unique value in providing information about short-term events, such as meteor sightings, volcanic eruptions, and especially the fugitive and strange atmospheric and aerosol phenomena associated with large explosions.

Dr. Richard S. Fiske, director of the Smithsonian's Museum of Natural History and himself an internationally known volcanologist, sped to St. Vincent at the first outbreak. There he could provide immediate liaison between field teams on the island, the Institution in Washington, and national and international organizations concerned. From the American side, scientists and equipment—including weather satellites of the National Oceanographic and Atmospheric Administration (NOAA), Air Force and NASA research planes, and NASA's SAGE satellite (Stratospheric and Aerosol Gas Experiment)—all came into cooperation.

A sequence of eight eruptions during April was observed by the SMS-1 satellite, a geostationary meteorological satellite maintained in orbit 22,000 miles above the equator. Images became available at least every half hour, from which continuous film loops were prepared which showed graphically the explosive growth of the eruptions.

On April 16 the NASA Wallops Flight Center P-3, returning from Brazil, stopped to refuel at Barbados, 100 miles east of St. Vincent. The plane was packed with delicate instruments, perfectly suited to observing atmospheric phenomena associated with an eruption. SEAN was able to have the plane diverted for a flight to St. Vincent. As it was approaching the island, at 4:57 P.M. on April 17, the volcano erupted violently. From the plane it was possible to estimate the height of the eruptive column (60,000 feet) and the length of the plume of volcanic ash (more than 60 miles).

Instances of this sort of collaboration (the results are just published) are still too rare between atmospheric scientists and geologists, and the speed with which the Smithsonian's specialists and SEAN were able to proceed proved once more the value of such a system. Only in this manner, perhaps, can the mysteries of volcanic eruptions in faraway places be interpreted and eventually understood for the good of all mankind.

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Letters to the Editor

The U.S. Coast Guard

Dear Sir: I enjoyed William A. MacLeish's article in the July SMITHSONIAN, but looked in vain for mention of some of the most active and dangerous Coast Guard stations in the Western United States—the Air Rescue Station at Astoria, Oregon, and the Cape Disappointment Station across the Columbia River at Ilwaco, Washington, which has the only rough-water school in the country. Men are sent there from all over the United States to learn how to handle rescue boats in heavy surf and high waves.

The Columbia River bar is considered one of the most dangerous areas that the Coast Guard patrols, and many "Coasties" have lost their lives attempting to save fishermen and recreational boaters.

As the mother of one of these Coast-guardsmen, I admit to some partiality, but I hope you will agree that these brave men deserve recognition along with the men from the East Coast.

Sheila G. Hudson
Vancouver, Washington

Dear Sir: From 1938 through 1977 my late friend Edward Rowe Snow, newspaper columnist and author of many books on the seas and the history and romance of Boston harbor, was the Flying Santa of East Coast lighthouses.

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Many of the fine details have been hand-painted.

Shown smaller than actual size of 8"

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Lifesaving Museum is creating an Edward Rowe Snow "Lighthouse Room" containing much of his memorabilia.
Walter S. Ehrenfeld
York, Pennsylvania

Dear Sir: Your superb article raises obvious questions at a time when the fascination with development of systems for war seems running out of control. One would hope that more consideration would be given to funding the only U.S. armed service devoted mainly to the saving of lives.

Also, attention must be given to the certification of skippers in the private-boating sector. This and the strengthening of Coast Guard support units merit renewed examination.
Richard L. Weed
Branford, Connecticut

Dear Sir: Your reference to the *Stockholm*'s knifing into the *Andrea Doria* was transposed from "1956" to "1965." I was almost on the *Andrea Doria*'s fatal voyage in the summer of 1956 and I've always been glad my travel plans were changed.
The Rev. Terence Sullivan, OSB
Atchison, Kansas

El Greco

Dear Sir: Your splendid article was especially interesting to me because I have in my home a reproduction of the beautiful painting you call *Madonna and Child with Saint Martina and Saint Agnes* [detail, below]. I am puzzled by your title, as I have always understood that St. Tecla is the figure at lower left.
Tecla M. Kern
Elmhurst, New York

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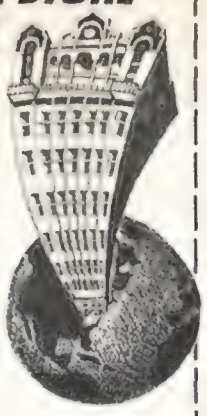

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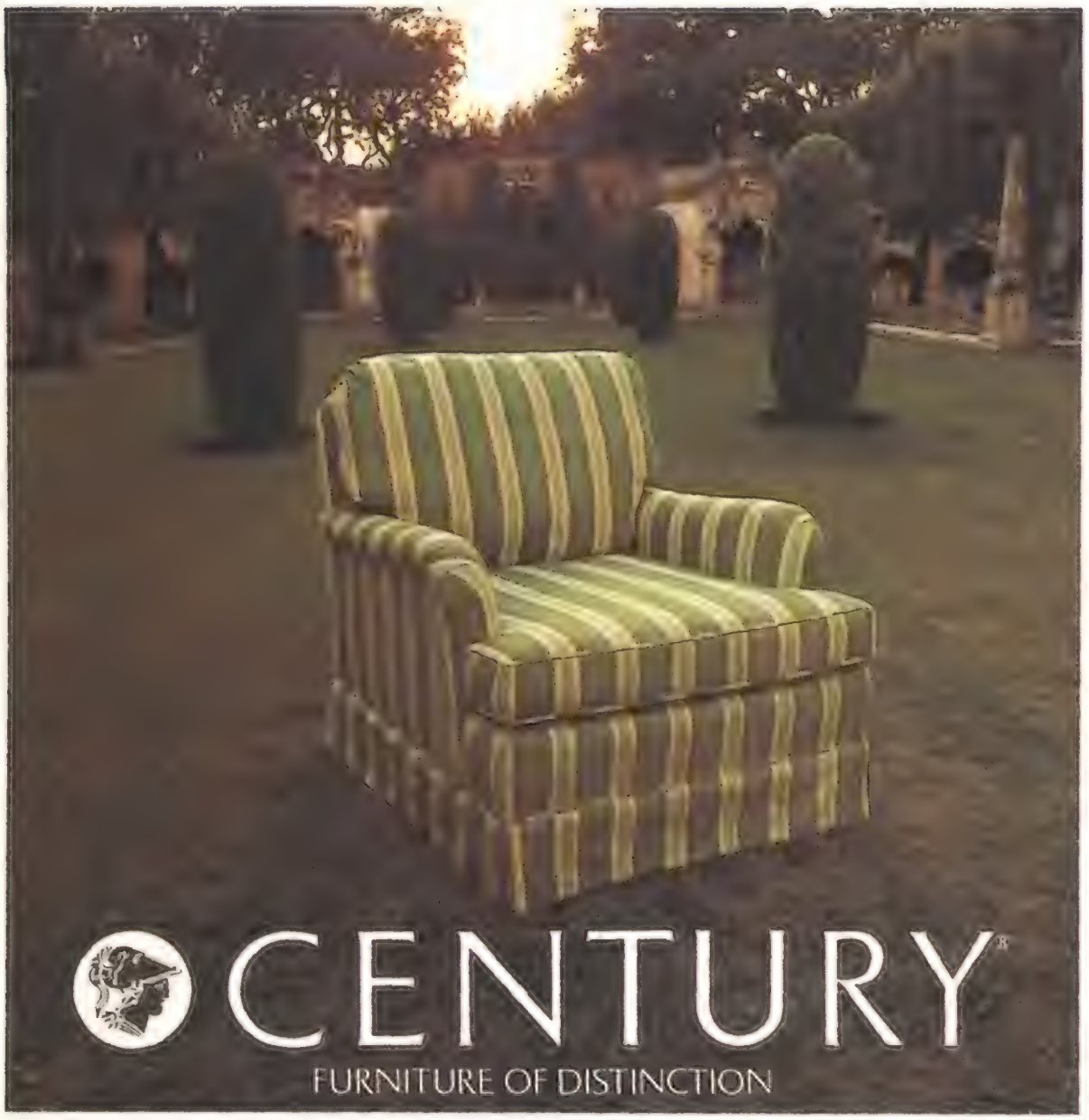

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For centuries it was believed that El Greco had portrayed St. Tecla—first martyr of the Greek Church—as well as St. Agnes. However, recent iconographic studies conclude that it is St. Martina, an early Christian martyr who was thrown to lions but whose purity kept them from devouring her, who appears at left. St. Martina's right hand is resting on her symbol, a lion. The fact that the wealthy Toledan who commissioned the painting was named Martin Ramirez may have influenced El Greco's choice of saints. Ed.

Golden Gate Bridge

Dear Sir: Those readers who travel to San Francisco might like to know that Mr. Strauss designed the San Francisco anchorage of the bridge to pass over historic Civil War-era Fort Winfield Scott (now known as Fort Point). He felt it would be wrong to destroy such a historic building. For that reason the first 320 feet of the bridge arch over the fort before the aerial suspension span begins.
Richard M. Fisher
Morgan Hill, California

Dear Sir: Your article on the Golden Gate bridge was truly a trip down memory lane for me. I was a student at the University of California during its construction, and from my window in the International House in Berkeley I could watch the daily progress of this tremendous undertaking. I received my B.S. in May 1937, the same month in which the bridge was opened.

The "engineering-school dean from the University of California" to whom you refer would be none other than Dr. Charles Derleth. I will never forget a memorable experience that occurred one morning in the late 1920s, several years before construction began. My father was county engineer of Contra Costa County, a short distance from the proposed bridge site. Dr. Derleth dropped into his office and the conversation turned to the design of Golden Gate Bridge, on which the dean was a consulting engineer. There had been quite a bit of discussion in the press about the ability of such a bridge to withstand our California earthquakes. Dr. Derleth took a pencil from his pocket and on one end of the drafting table drew a rough sketch of the bridge. He went on to tell us how the structure was designed to withstand a horizontal swing of at least 27 feet in the wind, and how extreme

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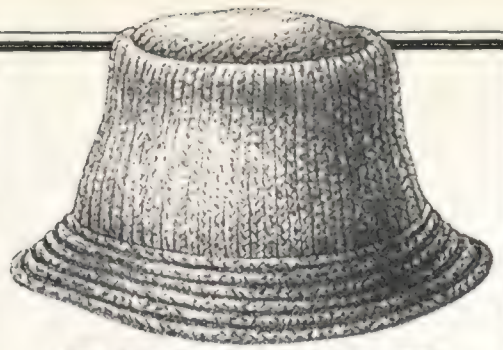

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differences in temperature would cause the center span to rise or fall some 16 feet. With provisions for such movements, Dr. Derleth assured us, there would be nothing to fear from an earthquake. The sketches he drew on that drafting table remained for years. No one wanted to erase them.
James Arnold
Martinez, California

DEAR SIRS.

The PICTURE ON PAGE 102-103 OF the JULY 1982 SMITHSONIAN is NOT the TOWER OF the GOLDEN Gate bRIDGE. It LOOKS LIKE the OAKLAND Bay bridGE.

Jason Feldman – AGE 7

It is. We crossed the wrong bridge. Ed.

Bird song

Dear Sir: Joel Gurin's article states that "One of the essential uses of song is to scare off the intruders on a bird's home territory." I comment with a bit of doggerel: How odd the ways of birds/ They bid their rival: Hence!/ By singing pretty songs/ What belligerence!
John Bosack
Flushing, New York

Dear Sir: Trying to read meaning into bird songs, especially those that are construed to mean a mating offer, is an invasion of the birds' privacy. Their mating calls are meant only for other birds. Reading this article was not a tweet for me.
Samuel Hollinger
Mechanicsburg, Pennsylvania

TRON

Dear Sir: Your article underlines the fact that computer, telecommunication and audiovisual technologies are changing the

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Diameter: 22.05 mm
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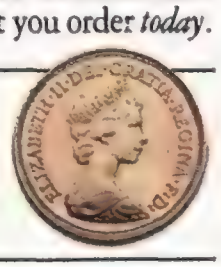
Some want these coins for their rarity, some for their value. But many want them for the beauty with which the legend of St. George is portrayed. We expect an immediate sellout, so we suggest you order *today*.



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way people live and work. I found the photograph of the Disney and MAGI "choreographers" conferring via computer and telephone hookup particularly instructive.

The world of painting especially, so long rooted in two-dimensional canvas, is undergoing a cataclysmic revolution. Technology is transforming it into more three-dimensional reality. Once holography is perfected, computer-generated illusion will become commonplace. Imagine being able to change the interior decor of one's home with a flick of a switch!

Elaine Cohen
Croton-on-Hudson, New York

Highland fling

Dear Sir: Enjoying bagpipe music has nothing to do with your ancestry. There are no Clan MacWorbs and no tartans in Bavaria, but I liked the sound the first time I heard it.

The pipes are a universal instrument dating back to ancient Persia, and probably far beyond. They are not uniquely Scottish or Irish. Although the Scots never admit it, most likely they got the pipes from the English, who got their version from the French.

If author Richard L. Williams doesn't thrill to *Scotland the Brave* when the massed bands march off, then he has no ear for music. And if he feels nothing when the pipes at sunset play *Will Ye No Come Back Again?*, he has no heart.

Frank C. Worbs
Vanport, Pennsylvania

Dear Sir: We pipers have a sense of humor about our instrument and realize that its sound is not for everyone's ear. However, Mr. Williams' antipipe attitude impoverished his article.

For many cultures throughout history the bagpipe has been the music of the people. In our age of electronic synthesizers and sophisticated audiophonics it serves as a reminder of our ancient musical heritage. As a primitive instrument it has remained relatively unchanged for centuries. It calls forth what Jung referred to as the "collective unconscious," the stored memories of the race of mankind, the sounds that stirred our ancestors.

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President Fears 'Very Heavy Losses' on Oahu—Churchill Notifies Japan That a State of War Exists
PACIFIC OCEAN: THEATRE OF WAR INVOLVING UNITED STATES AND ITS ALLIES

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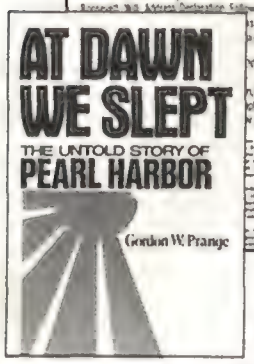

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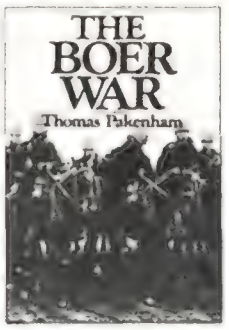

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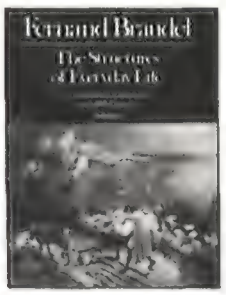

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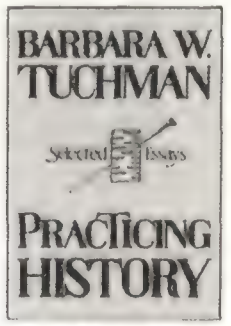

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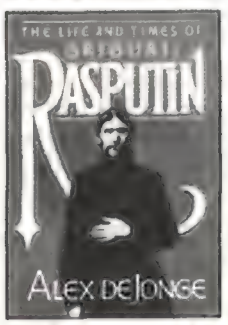

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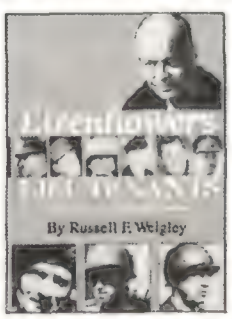

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Dear Sir: Edwards Park's statement that his visit to the U.S. Capitol was the kind of tour visiting school kids get is really off base. He was treated like royalty. School kids are ushered into the rotunda and to one other site and then downstairs and out the door via the souvenir shop. Each year the tour gets shorter. Years ago we were able to see the House and the Senate—then only one chamber—now neither. Nor do we see the old Supreme Court chamber, the old Senate room or any of the other features that have been spruced up with taxpayers' dollars for visitors who can't get near them.

Richard A. St. John
Toledo, Ohio

Thomas Nottingham, Chief of Capitol Guide Services, replies: "Since 1962 visitors have increased from 600,000 a year to 1.6 million. It's like pouring 20 gallons of water into a ten-gallon jug. Most schoolchildren come during our peak period, March through August, when we often have 11,000 visitors a day compared to 1962's 4,000. We have security regulations we didn't have then, and frequently the House or Senate is closed for a caucus, a big vote or visiting dignitaries—all without prior notice to us. Upon request, members of Congress give constituent groups letters admitting them to House or Senate sessions." Ed.

Headlines

Dear Sir: My favorite headline was told me by a friend who lives in Bristol, Tennessee. It seems there was a murder in nearby Wise, Virginia. The Bristol paper headlined the story: WISE WOMAN KILLS HUSBAND.

Charles Rankin
Milledgeville, Georgia

Dear Sir: This headline in the *Boston Herald* in the early 1960s greatly entertained me, then a young, impressionable newsboy. Reporting an action of the Boston Redevelopment Authority, the banner blared: BRA APPROVES THIRD DEVELOPMENT. This act of approbation by an undergarment for such an anatomically intriguing addition still amuses me.

Scott Macfarland
Otsego, Michigan

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Around the Mall and beyond

This month will see the publication of a new monster volume about the Smithsonian from the New York firm of Harry Abrams. If you're lucky, and your fingers are strong, you have read through the huge, beautiful, fascinating books that Abrams has produced on the National Air and Space Museum and the Museum of American History. Now it's the turn of the Museum of Natural History, and the new book, like its predecessors, will delight the eye, stimulate the mind and sprain the knuckles with its weight.

Photographers have handled this great, confusing museum with both love and imagination, digging out little-known objects for their topics, finding untried

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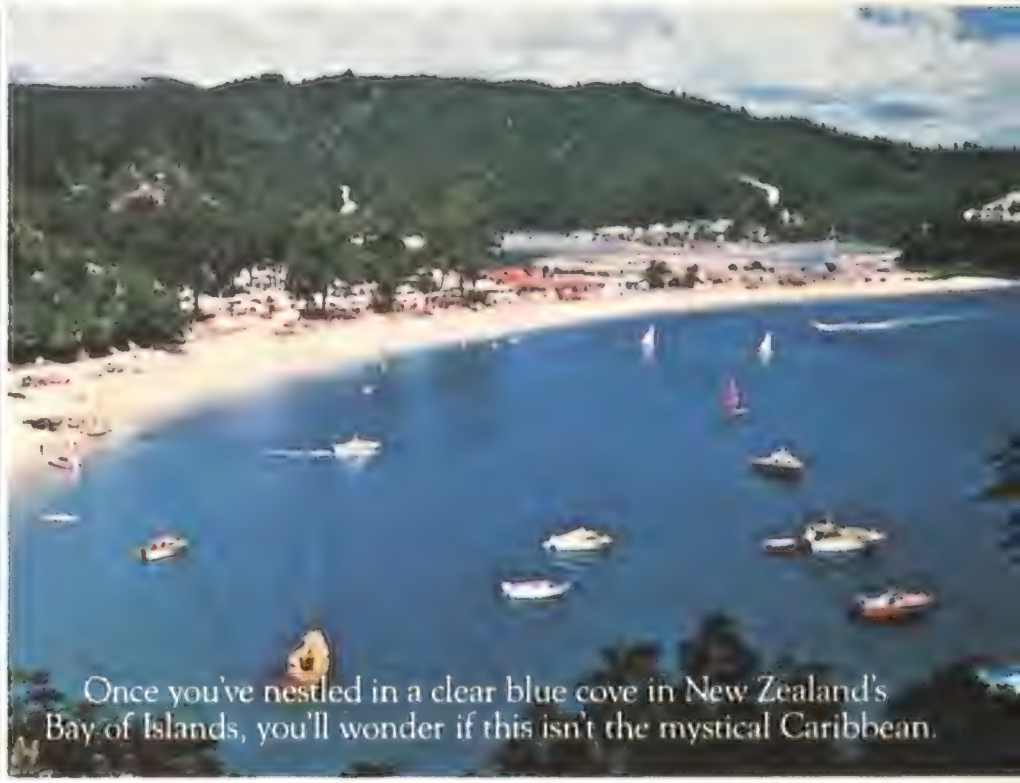
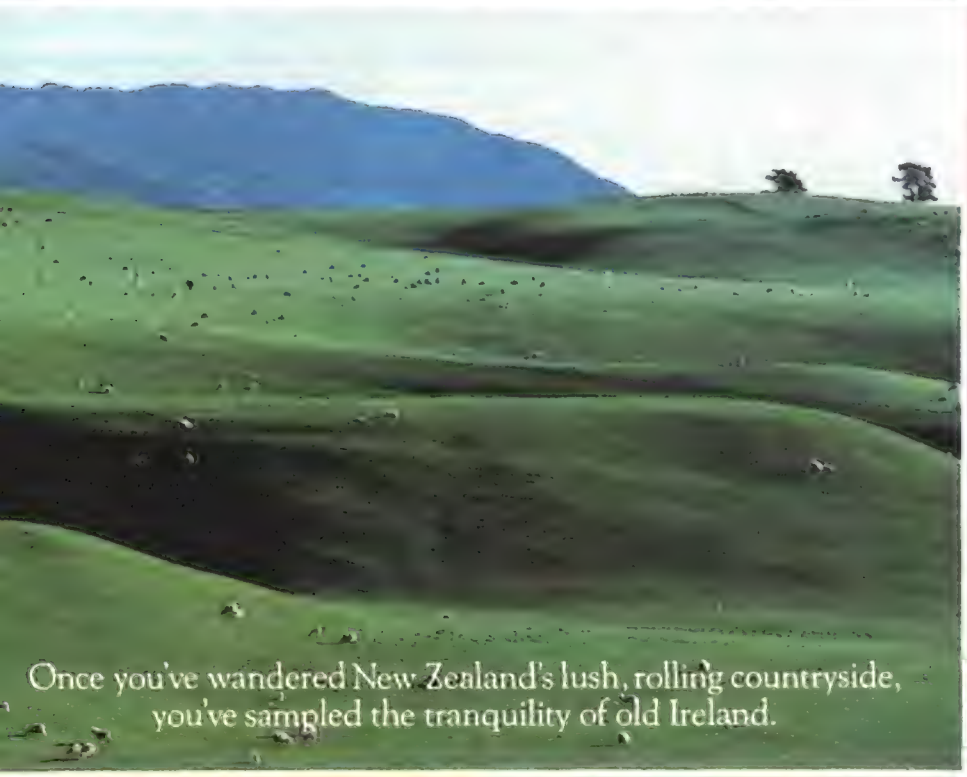


Once you've nestled in a clear blue cove in New Zealand's Bay of Islands, you'll wonder if this isn't the mystical Caribbean.



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New Zealand

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angles and illuminations for their pictures of old standbys like the African elephant in the rotunda (p. 24).

The text is by Philip Kopper, a Washington writer who mixes a rare perception of science with obvious affection for the Institution. His explanation of the long, feathered headdress of Plains Indians (and others), as gleaned from Smithsonian anthropologists, is a small tour de force. It appears that all those feathers were originally worn in pre-Columbian Brazil; that they became associated with all American Indians through the illustrations of the earliest explorations; that Indians who had never worn them before then started to—because to the Europeans it was de rigueur.

These and other artifacts and specimens began to flood into the Institution after Spencer Baird (later our second Secretary) became Secretary Joseph Henry's assistant in 1850. When Baird arrived to begin work, "he brought with him," says Kopper, "two boxcars containing 3,600 birds, 500 jars of reptiles and fishes, 600 skeletons, sundry mammals and some fossils. . . ." These kicked off the Smithsonian collections—and, of course, the Museum of Natural History, to which they would all, finally, gravitate. The present museum wasn't built until 1911, but natural history has always been the "beat" of the Institution.

Kopper has written a previous book, *The Wild Edge*, in which his knowledge of natural history enriches every page. This is the story of the Atlantic beaches and the life that can be found along them. And it's a feast not only for the mind, but for the body. Not only does Kopper describe some little shoreside critter, but he often tells you how to cook it (or not to cook it) in order to eat it.

As author of *National Museum of Natural History*, Phil Kopper has been given room to express some thoughts about selection and evolution. He is a careful and studious writer, and he manages to illuminate his subject as imaginatively as the photographers who have so lavishly illustrated this book. It's as good as it is heavy.

One of the spin-offs of the Natural History Museum is a small research station on Florida's east coast. It used to be called the Fort Pierce Bureau. Now it's known as the Smithsonian Marine Station at Link Port, and its research is conducted in space rented from the Harbor Branch Foundation, Inc., a marine science and oceanographic engineering facility which was established in 1970 by J. Seward Johnson sr. (Johnson & Johnson medical supplies, remember?) and the late Edwin A. Link (SMITHSONIAN, May 1980), who invented, among many devices, the famous Link Trainer, a devilish World War II flight simulator used to inject would-be pilots with humility.

By some ingenious machinations, I was able to make it so convenient to visit Link Port last February that no one could deny me. The place consists of a number of large, squarish buildings along a long, straight channel which leads into the Indian River lagoon between the cities of Fort Pierce and Vero Beach. I arrived at the establishment, found a slate-blue building with "Smithsonian Institution" writ large upon it and discovered inside Dr. Mary E. Rice, an invertebrate zoologist and curator of research, who serves as the chief scientist of the station.

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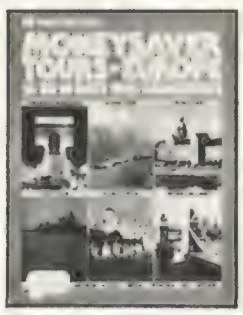

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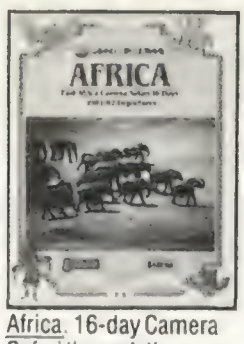

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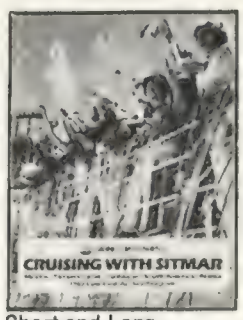

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Dr. Rice proved most hospitable and cordial, but after a memorable lunch at a splendid seaside restaurant, it became increasingly clear that neither she nor any of the other scientists to whom I had been introduced had the faintest clue what to do with me. It was finally decided, sensibly, that the best way for me to see the kind of work the Smithsonian people do at Link Port was to take part in it. A research vessel owned by the Florida Institute of Technology was out in the Gulf Stream dragging up netfuls of plankton. After it returned, Mary Rice and her cohorts would be investigating the catch. Be there, I was told.

The schedule left me time for a briefing and tour of the establishment. I learned that Johnson and Link combined their enthusiasm, inventiveness, idealism and resources to create their foundation on the banks of this man-made channel. They put up beautifully equipped laboratories, a splendid library and superb engineering facility, where the tools for marine science could be fashioned.

The most impressive of these tools have been Ed Link's Johnson-Sea-Link submersibles, tiny submarines for delving after marine life and hauling it to the surface for later study. The strange little vessels look somewhat like miniatures of the giant spaceship in *Star Trek*. They have spherical observation posts where scientists can peer out at ocean life down to 2,000 feet. If they see something worth grabbing, they do—using space-age extendable grippers like lobster claws or a suction device called the "critter-gitter."

Developing this sophisticated, specialized equipment has been one of the twin purposes of the Harbor Branch Foundation. Putting it to work for science has been the other. The place has opened its doors to scientists whose specialties benefit from such devices. The Smithsonian became a tenant early on.

The Institution built its own administration building and in collaboration with the Harbor Branch Foundation established a collection of reference specimens. It has the use of other labs and equipment, and it has its own floating lab—a nice old barge, fitted out with the trappings of science.

Mary Rice is studying sipunculan worms—in larval form, tiny little fellows with dark spots on their heads. She has sin-

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gled them out because they are distributed widely through all the oceans of the world and the station at Link Port allows her to get larvae from the Gulf Stream, rear them and perhaps learn a bit about their primitive existence. "What makes the larvae settle, for example?" she asks. "When and why do they stop swimming and become bottom dwellers?"

She is experimenting with effects that appear to speed up the rate of their metamorphosis to adulthood. "Scientists are interested in seeing how populations are maintained," Mary Rice says. She has worked out a line of investigation to see why her tiny worm larvae grow faster in water which holds adults. There's a lot more to that, and if you think I'm going to try to describe it, you're out of your mind. Let Mary Rice tell you.

Juvenile sipunculan metamorphosed from larva in Dr. Mary Rice's lab.

Other Smithsonian people at Link Port have been studying adult and larval crabs; sea cucumbers and sea urchins; single-celled, shell-dwelling foraminifera; polychaetes, or segmented worms; and the reproduction of gastropods. All make good use of these facilities, remarkable because of the proximity of the Gulf Stream and also the brackish Indian River. The place, near the tropics, but not quite there, is a valuable biological site.

I was recruited by Dr. Rice and her crew to follow through with the sipunculans from the moment they were unloaded from the research ship to their thorough investigation by microscope. Next morning, I was to help dig some segmented worms along the banks of the Indian River. When not thus engaged, I was free to wander around the 400-acre establishment. This would keep me

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So I wandered, recalling that someone had said that a fringe benefit for any scientist at Link Port was the beauty of the place. Right. I followed a "nature walk" that evening, leaving the road beside the channel and winding through scrub trees to the shore of a small pond. As I approached the water, I heard an unmistakable "plop." I watched the surface for minutes, then became aware of two eyes watching me back. Two eyes and then, magically, a long, knobby spine. A beautiful, ten-foot alligator.

The story is told at Link Port of a visiting German scientist who evinced a desire to see an alligator. So his hosts led him to this or a similar pond and tossed some marshmallows into it. Alligators apparently love marshmallows—a tidbit of information that had bypassed me—and soon one appeared on the surface and started to slide toward shore, glomping down one goody after another. The German, so goes the tale, was enthralled. Not with the alligator. With the marshmallows.

I watched my friendly saurian, thinking of all those Tarzan movies, and then I heard a stir of activity back at the channel, so bade him/her farewell. The research vessel was docking. I hurried over to watch the cargo of barrels, sloshing with plankton-rich seawater, being unloaded by husky young men and women with mahogany tans. When they piled into a van to drive back to the Smithsonian lab, I cadged a ride.

That was a great evening. We used low-power microscopes to peer into bowls of water which appeared to me about as clear as the stuff that's served in many restaurants. But the microscopes revealed a teeming habitat of little crabs and mollusks and other beasties, all darting about their business with total disregard of the giant eye that watched their every move. It was enough to make you think: first about whether or not *you* are being watched as you watch these small citizens of a plankton patch; second, about that restaurant water.

I am happy to report that unlike James Thurber, who took a college botany course twice without ever seeing *anything* through his microscope, I saw a sipunculan larva—a tiny black-eyed creature who seemed a bit puzzled at what was happening to him.

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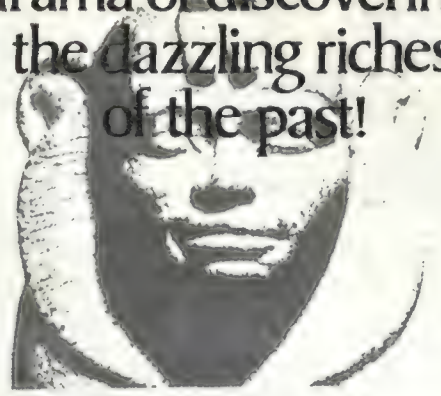

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The Clipper Ship
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Phenomena, comment and notes

A daydream about the way things were ends up in a fantasy of abandoning the Earth just long enough to save it

A dark forest used to stand silent just inside the National Museum of Natural History, a growth of hemlocks four to five feet in diameter. Through the trees you could see a river, a wooded island on the right, and acres of wild rice to the left. No bridges crossed the river. It was the spot where Rock Creek empties into the Potomac River in Washington, and you were seeing it as the Indians saw it before Europeans arrived. Malls and memorials stand now where once the wild rice grew; a seawall keeps the river in its place.

When I walk the seawall, I try to see the river as it was. I do the same on Chesapeake Bay or along the Hudson River, remembering accounts of the extraordinarily abundant fish and wildlife found by the early explorers. And I wonder how well they might recover if we went away for a few centuries. Would hemlocks grow again in what is now a boathouse parking lot at Rock Creek?

My only empirical data come from a 5-by-20-foot bank alongside my driveway. A rock garden planted with lilies and irises when I moved in six years ago, I abandoned it in the press of other business. Today, thanks to the wind and the birds, it is crowded with oaks, maples, dogwoods and a yellow poplar already 15 feet high. A living wall. All I had to do was stand back out of the way.

To find out what would happen on a larger scale, one could consult the literature on plant succession, study abandoned highways, visit ruins in Mexico, travel to lost cities in Asia. Or one could make evacuating the entire Earth the premise for a science-fiction story, and let the special-effects people fill in the details when the story is snapped up for a major motion picture. New York City 10,000 years after the last human left would be a new challenge for the model makers.

The scenario goes something like this: the time comes when, despite our best efforts, the only way left to save Earth is to leave it. Everybody. For a long time. So many species have been lost, so many ecosystems impoverished, that the whole biological life-support system is close to collapse. The natural waste-removal systems, the recyclers, the air filters and water holders are being overwhelmed.

In this fantasy future, field biologists are the new elite. They are paid more than Congressmen, although less than basketball players. Biologists have been multiplying as fast as species have been disappearing. In 1980 one expert had told Congress that there were only 1,500 people in the world competent to identify tropical organisms; when brown leafhoppers destroyed several billion dollars worth of rice in Southeast Asia in the late 1970s, only a dozen people in the world could distinguish with certainty the 20,000 species that make up that insect group.

Now, some decades later, armies of biologists carry on with a wartime intensity, desperate to learn more about how the natural systems work before they disappear. They need to know not only what should be saved first on Earth, but what should be added to the recycling systems on the space colonies and asteroid mines overhead which, like some of the most carefully assembled home aquariums, do not quite work. By now humans live as far away as the moons of Jupiter, but all the secrets of life remain on Earth.

At some point it becomes clear that the race is being lost. True, human numbers are dropping. Heavy industry has moved into space. But so much tropical forest has already been cut, so many watersheds destroyed, so much topsoil washed away that the biological decline has unstoppable momentum. It is too late for management, no matter how wise.

Thus a decision once made by bands and tribes, to pack up and move, is now made by the population of a planet. The actual mechanics are a little fuzzy in my

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fantasy, except that more and more people would move into space to build more and more colonies for more and more people to move into space.

With a little suspension of disbelief one can see the story unfold. Grass appears in the boathouse parking lot. A small section of the seawall collapses and, with no one around to fix it, the river moves in like a silent bulldozer. The noblest experiment of all has begun.

Now the story moves in fast-forward, time-lapse photography; we watch nature reclaim itself through the eyes of appropriate creatures. Early on we see city streets through the eyes of a rat; we follow the feral dogs and cats that roam the suburbs along with the raccoons and skunks. A century later a coyote hunts in the streets of Manhattan; five centuries after that a panther uses the pinnacle of a rubble pile to search for prey. A pigeon's eye view of a city changes to a falcon's.

Humans will not be able to leave the planet completely alone, of course, any more than an editor can pass on a manuscript without making a mark. The luckiest biologists of their generations will be landed at monitoring stations. Remote sensors will be maintained, camera lenses cleaned. A little crisis intervention might be allowed at first: aerial tankers putting out a fire about to destroy the last known stand of some special plant. But as far as humanly possible, the biologists would keep their hands off, acting only as passive receptors. Nature would be the protagonist and the star. A living Earth regenerating from the ruins. The miracle that struggles to happen in every vacant lot happening everywhere. All with appropriate inspirational music, of course.

Conflict for a story line should be easy. At the start the conflict would be over whether to leave; I could stoop to a line something like: "Gazing out into the dark—30 stories above the East River—after a day of hearing out the biologists' deputations, the Secretary-General became biologically literate." Later the conflict over whether it was time to return would grow stronger. The latter argument would not sound entirely unfamiliar to anyone who follows today's debates over multiple use versus preserving wilderness areas unsullied. A writer might suffer the temptation to inject ideological harangues into the dialogue.

In the meantime, the miracle would be

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I've included gifts for children. Gardeners. Even the man in your life. How about a meerschaum pipe-carving kit from the Isle of Man?

To be honest, not all my collection is European. From China, say, come porcelain and pandas and cloisonné. While many of the over 160 personalized gifts are crafted in my own New England workshops.

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Abandoned U.S. Capitol stands overgrown in a scene from the movie *Logan's Run*.

fact. The biological crisis would be past. Nothing would have returned from extinction, but the several million species left would be plenty to keep the bio in biosphere. An optimist would end the movie with humans returning to live in gentle coexistence. A pessimist might have us come back to ravish the Earth all over again. Something in between seems more reasonable.

I'm completely over my head in every part of this fantasy, of course. If we flew 100,000 people off this Earth every day, it would take 125 years to move the current population. I certainly don't know if hemlocks could or would ever grow again in that boathouse parking lot.

But I like the uniting of what are now inimical factions: the high technologists who believe the future of our species lies in space, and the environmentalists who fear we would foul the rest of the solar system just as we have fouled the planet. Environmentalists might be a little humbler if the spacers save the world. I also like the idea of a species, grown out of its infancy, given a second chance at husbanding a remarkable place to live. Possibly even the only place to live.

But the strongest appeal is really the vision I started with—fish leaping in clear water, forests growing to the water's edge, swamps and marshes pulsating with life. The way things were here just five or six lifetimes ago.

To some people today, an environmentalist is a monomaniac. Worse, still, is a preservationist: an elitist unconcerned with people. Perhaps I am most unspeakable of all: a preservationist who not only wants to keep what we still have but would like to bring back what we once had. I don't feel antipeople at all. We people need the life support of the biosphere. The whole system is slowly failing, but still has the power to regenerate without any help from us. All we have to do is stand back. Now, if only that were somehow possible.

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By Patricia Curtis

Animal shelters struggle to keep up with millions of abandoned pets

Americans discard more than 200,000 creatures every week, and about three-quarters of them have to be destroyed. But things are improving

On a winter evening in New York City in 1868, a heavy snowfall had left the streets almost impassable. A horse-drawn streetcar filled with people was stuck in a snowdrift; the driver was whipping its two floundering horses, straining frantically to free the unmoving car. Suddenly a tall, well-dressed man bounded into the street. "Stop beating those horses, you fool!" he bellowed.

Within minutes the stranger, bristling with authority, had made the passengers get out, led the exhausted horses out of the snowdrift, and convinced the intimidated driver that if he flogged the animals again, or allowed the streetcar to become overloaded, he would be arrested. So a number of grumbling people had to walk home that night, two workhorses were spared further beating, and a streetcar driver had met up with Henry Bergh.

One characteristic of the mid-Victorian period was a mood of moral indignation. *Les Misérables* and *Uncle Tom's Cabin* both left a mark, debtors' prisons were abolished in England, and the Emancipation Proclamation announced to the world that the United States, officially at least, considered human slavery unacceptable. Americans were ready for Henry Bergh.

When he arrived on the scene, cruelty to animals was ubiquitous and ignored. Leaving aside the atrocious way animals were transported and slaughtered for meat, the inhumane conditions of zoos, the casual violence of blood sports, the primitive uses of animals for medical experimentation, and the decimation of wildlife, the treatment of those creatures with which people came most frequently into contact—horses, dogs and cats—commonly fell between neglect and barbarism. In the New York City of the 1850s and '60s, as many as 300 stray dogs were rounded up every day and thrown, 60 to 80 at a time, into a cistern, which was then filled with water. Later, the cistern was replaced with a crate that was loaded with dogs and swung into the East River, to the cheers of waterfront men and boys who gathered daily for the afternoon "show."

"Frequently the poundmaster had to douse the crate several times before all movement ceased in the soggy mass of carcasses," writes Zulma Steele in her biography of Henry Bergh. Poundmasters in other cities used more direct methods: they simply chained up vagrant dogs and clubbed them to death.

But it was the everyday abuse of cart and carriage horses that aroused the sympathies of compassionate people, and Henry Bergh aimed his efforts first toward the relief of these animals. Bergh was a patrician, a dandy who wore spats and a top hat—and a zealot. During an early period in his life, he served as a diplomat in the American legation in St. Petersburg, and it was there that the plight of the workhorse awakened a response in him. Bergh came home to New York with blood in his eye and threw himself into his crusade.

In Albany in 1866, he managed to get an old, ineffective anticruelty law replaced and set up an agency to enforce it, thereby establishing the American Society for the Prevention of Cruelty to Animals as the first chartered humane organization in the United States. The following year he drafted a stronger law and got that passed, too.

A cat watches from its cage at the New York ASPCA shelter. The odds are high against its adoption.

Photographs by Richard Howard

Animal shelters fight the numbers

Henry Bergh, ASPCA founder, inspects horses pulling an overcrowded trolley in an 1872 wood engraving.

Today a whole body of law protects domestic animals; humane societies and SPCAs cover virtually the entire country. But out-and-out cruelty persists, with few arrests and fewer convictions. Animal shelters, both public and private, are finding it increasingly difficult to cope with the more than ten million pets abandoned each year. The problems may be less visible than they were in Bergh's day, but they are just as real.

A century ago, Bergh traveled extensively across the country, lecturing and pleading the cause of animals, leaving a trail of newly formed or incipient SPCAs in his wake. One person he inspired was a San Francisco banker named James Sloan Hutchinson, who did not waste time—the city's SPCA was chartered in 1868. Its horse ambulance, by the way, was to prove useful to human beings: in the 1906 earthquake and fire, it was pressed into service to transport injured people.

Bergh's anticruelty law also had an unexpected human benefit. While mistreatment of animals was pandemic, child abuse was also widespread, and it was not uncommon for very young children to be hired out as "drudges." One such child, named simply "Mary Ellen," came to the attention of Bergh and became the center of a dramatic case. Jacob Riis described the courtroom scene: "I saw a child brought in, carried in a horse blanket, at the sight of which men wept aloud. I saw it laid at the feet of the judge, who turned his face away, and in the stillness of that courtroom I heard the voice of Henry Bergh. 'The child is an animal,' he said. 'If there is no justice for it as a human being it shall at least have the rights of the cur in the street. It shall not be abused.' . . . For from that dingy courtroom, whence a wicked woman went to jail, came forth the New York Society for the Prevention of Cruelty to Children, with all that it has meant to the world's life." Bergh would serve as vice president of the new society.

Henry Bergh was by no means a saintly man. He had an eye-for-an-eye sense of justice; he wanted people who were cruel to animals to be whipped and clubbed; he advocated the whipping post and capital punishment. While he did press for humane slaughter, he ate meat "because of habit," as he said.

Among the people Bergh corresponded with was a Philadelphia lady named Caroline Earl White. Mrs. White was apparently unimpressed with the newly formed Pennsylvania SPCA, so in 1869 she organized the Women's Pennsylvania SPCA with a board composed entirely of women. They felt that an animal

Patricia Curtis is working on a children's book about animal shelters. She discussed the use of pets in therapy in the July 1981 SMITHSONIAN.

shelter was essential, so they set one up right away, the first in the nation.

A portrait of Mrs. White shows her as a rather stern, no-nonsense woman of imposing mien. She must have run a tight ship; early records reveal that one year the organization had an operating surplus of 15 cents. Today, the Women's SPCA still exists independently of the Pennsylvania SPCA as a full-service agency operating with no public funds and a million-dollar budget, and its board is still entirely female.

In 1868 another woman, this one in Boston, joined the company of activists for animals. Mrs. William Appleton had just applied to incorporate a Massachusetts SPCA when a godsend in the form of an outraged lawyer fell into her hands. George Angell was a successful lawyer with a strong New England conscience honed by his professional association with Samuel Sewall and that gentleman's circle of abolitionists. One day when two horses were driven to death in a local race, he immediately joined Mrs. Appleton and her band of Beacon Hill crusaders, who promptly made him the director of the MSPCA. Angell plunged into the cause with the same zeal as Henry Bergh, though perhaps with more tact and moderation, and eventually dropped his law practice altogether to devote full time to the MSPCA.

Angell believed that what was needed most to turn the tide of animal abuse was education. He traveled widely, speaking at schools, church groups, women's clubs and conventions, and he exhorted other humane groups to follow this course. Angell also founded and edited a monthly magazine, *Our Dumb Animals*, and published the first edition of *Black Beauty*.

When George Angell died in 1909, his funeral cortege appropriately included 38 cart horses, which followed his body to the cemetery. The MSPCA's animal hospital is named Angell Memorial.

The nation has a long way to go

In the years that followed the efforts of these good men and women, other humanitarians quickly formed SPCAs and humane societies throughout most of the United States. Sometimes they took names like "animal rescue league," "anticruelty society," "dumb friends' league," or some such. By whatever name, their charters empowered them to enforce humane laws, shelter unwanted pets, and rescue the injured, lost and abandoned. But in spite of much human energy and dedication, despite bequests and donations, despite the passage of more anticruelty laws, the fact is that in America today the needs of unwanted pet animals are not being met. Cruelty to animals is less public but still widespread.

It is true that if, today, a poundmaster were to take the city's stray dogs, lock them in a crate and drown them publicly, most citizens would not stand for it. Euthanasia methods have become more humane. Yet every so often, appalling conditions in a shelter are exposed by the media and the people in charge are forced to clean up their act, temporarily at least. As for Henry Bergh's anticruelty law, John Kullberg, present executive director of the ASPCA in New York, says that in a single recent year 4,335 cruelty cases were reported, resulting in 8,137 on-site investigations (including follow-ups), but only 504 summonses issued. Because vagueness in the law hurts cases in court, it is often best for the animal shelter simply to "educate" the owner.

"It's extremely difficult to prosecute cruelty cases," he explains. "The evidence and witnesses you need are

In an urban shelter, a newly arrived kitten gets a physical examination before being put up for adoption.

An unadoptable dog is given an injection of sodium pentobarbital, quickly resulting in painless death.

hard to obtain. The courts do not take animal cruelty cases very seriously."

In some cities, the SPCA or humane society may double as the pound, and employ animal-control officers (the dogcatchers of bygone days). In others, animal control is the responsibility of the police or other city department, but animals that are apprehended are brought to the SPCA shelter. In most communities, however, the pound is a separate entity. The purpose of a pound is not to place pets in homes, but to keep strays off the streets.

Pounds are supported by their city or county governments, though marginally, and many are little more than death houses for animals. Humane societies have been known to bring their local pounds to court on cruelty charges (but then grand juries have indicted humane societies on similar counts). However, the increased professionalism of animal control in recent years offers hope for improved handling of strays.

An SPCA or humane society that functions also as a pound receives a stipend from the city for this service, a small part of the society's total budget. Most agen-

cies, however, continue to survive on donations alone. Generally, the public does not realize this, especially if the agency bears the name of its city or state, as in the Los Angeles SPCA.

Some people have the notion that shelters make a profit on adoptions. "I have some more puppies for you," a woman cheerfully announced as she walked into the Atlanta SPCA carrying a large carton. When the man behind the counter sighed as he handed her a form to fill out, she looked puzzled. "Aren't you glad to get them?" she asked. "I thought that's how you make money: selling pets." Adoption fees, even with the deposit toward spaying or neutering that many shelters require, do not begin to cover expenses.

"Why? She's a perfectly good cat"

Recently, a man telephoned the shelter of the Animal Rescue League of Western Pennsylvania in Pittsburgh. "I want to drop off our cat," he said. "We'd like you to find another home for her."

"How old is your cat?" asked the shelter worker. "And why are you giving her up?"

"She's nine. We're moving to California and it would be difficult to take her with us," the caller replied.

"I have to tell you, sir, that in all probability we'll have to put your pet to sleep," the woman at the shelter explained.

"Why?" cried the man indignantly. "She's a perfectly good cat. Can't you put her up for adoption?"

Millions of people, despite the affection they may feel for their pets, have no compunction about discarding them when the animals become old, bothersome or inconvenient. Many people simply abandon them: a quick look around a summer resort after Labor Day will reveal any number of dogs and cats waiting on the doorsteps of boarded-up cottages. Visit any college in June and count the hungry, left-behind pets roaming around the campus. And most of those bodies of dogs and cats you see along our highways are not pets that wandered out of their backyards; they are pets whose owners dumped them out of moving vehicles, making killers out of the oncoming drivers. People have even moved away and left pets locked in the vacated apartments.

Owners who rightly consider it cruel to get rid of their unwanted animals by those methods avail themselves of animal shelters. Those shelters that accept any and all creatures brought to them are in a bind. They do offer animals for adoption—many of them mount creative and elaborate campaigns to stimulate adoptions—but the adoption rates fall far below the numbers brought in or rescued.

Unless the shelters euthanize most animals, they become intolerably overcrowded in days or weeks. The

Animals move through this shelter corridor either toward the kennel and adoption—or to be euthanized.

Abandoned dog at San Francisco SPCA ignores prankish grooming-school manager in a gorilla mask.

This former shelter dog has been trained to assist a deaf master by running to a ringing telephone.

number of pets killed varies from place to place, depending on a community's size, the availability of shelters and even on the mores of the local population. But the euthanasia rate is about the same everywhere: 70 to 80 percent.

Shelter managers choose the "unadoptable" animals for euthanasia each day. First to go are the sick, injured, or old ("old" usually means more than two years). Dogs that develop kennel cough (a minor respiratory infection) are killed quickly before they infect the whole kennel. "Unadoptable" includes kittens so tiny they need special care, cats with ear mites (a simple condition to treat and cure) and pets that have been passed up for adoption too many times and must give up their space so others can have a chance. "Unadoptable" also applies to pets with behavior problems—those that have become too shy, depressed or withdrawn. Biters, naturally, are also unadoptable, but is a dog truly a biter, or is it a normally gentle animal that is hysterical with fear over being separated from home and family? No matter.

Euthanasia is one of the main causes of burnout among shelter workers, according to Richard Avanzino, president of the San Francisco SPCA (opposite). "It makes me angry that we have to act as mercy killer for the community," he says. "We hide the plight of animals by collecting them off the streets so the public doesn't have to deal with them, and by executing them behind closed doors so the public doesn't have to see."

John Kullberg says that in New York City workers who, as part of their jobs, have to hold animals for euthanasia get a $5 weekly differential in their pay. The ASPCA today has to destroy more than a thousand dogs and cats each week.

Who should do the actual killing?

"I believe only the most skilled people in a shelter should do the euthanizing," says Edwin A. Beckcom jr., executive director of the Dallas SPCA. "Only four people here euthanize—myself, the shelter manager, the animal technician and the field investigator who may have to destroy an injured animal at the scene. Also, if people get to the point where they don't mind killing, they shouldn't do it any more."

Formerly, the standard method was the decompression chamber, a metal cylinder into which animals were loaded and from which the air was rapidly evacuated. Because of the many humane questions associated with it, this method has been abandoned by the better shelters in favor of sodium pentobarbital injection (p. 44).

What of the animal shelters that, in fund-raising brochures, advertise that they never put animals "to sleep"? They certainly have great appeal for kind-

hearted but unrealistic animal lovers. While they are probably telling the truth and may work hard at placing pets in homes, these shelters do great injustice to the SPCAs by making those groups out to be the bad guys. For one thing, most no-kill shelters accept only adoptable pets; if an unadoptable animal is left on their doorstep, they send it to the pound.

The late Patty Jaymes, a tireless activist who founded and ran a protection organization in New Jersey, Animals Need You, sized up the public-relations problems raised by this issue. To paraphrase one of the last articles she wrote: most shelters do not emphasize the likelihood that a surrendered animal will be destroyed. They are afraid that if you tell someone the truth, he or she will not understand and will not support the shelter, or will abandon the animal, and that's even worse. This failure to explain the problem has conditioned the public to believe that shelters can find homes for animals. There are *x* number of homes available. A home is not *found*, it is simply *filled*—a shelter does not create a home. Just because one animal gets a home, another will nevertheless die because it was not adopted. It is wrong for a shelter to publicize and capitalize on a no-kill policy, utilizing the good intentions of uninformed donors to perpetuate itself while other shelters, that bear the brunt of the burden, continue to go unhelped.

Private sanctuaries for the lucky few

Also competing for the animal-lover's dollar are the small private sanctuaries, usually run by women who, working for little or no salary, dedicate their lives to taking in other people's deserted pets, caring for them and trying to place them in homes. One such haven is the Kent Animal Shelter in Riverhead, Long Island, where 110 fortunate dogs and cats are kept in optimal conditions, neutered, groomed and selectively offered for adoption. Kent also runs a low-cost spaying and neutering clinic, one of the first in the nation.

Gretchen Scanlan, a founder and until recently the six-days-a-week general factotum of Kent, continually had trouble concealing her bitterness at the reasons people gave her for discarding their pets. " 'Allergies' was popular," she comments. "But if I asked, 'Oh, did you have a skin test to be sure it's the pet?' they looked blank. Moving, not enough time, behavior problems—I've heard them all. Let's face it; people give up their pets when the animals become inconvenient."

And there, apparently, is the crux of the problem. "We must see the trashing of animals within the context of our culture," says Dr. Alice DeGroot, staff veterinarian of the Animal Care and Education Center in Rancho Santa Fe, California. "The key value in America is *growth*—in productivity, money, artifacts.

Mark Weiss takes adoptable pets to different areas of San Francisco, with an 89 percent success rate.

San Francisco SPCA president Richard Avanzino with Sido, a dog saved from euthanasia, and P. C. Catt.

We have a consumer economy in which animals represent artifacts. People who come into a shelter to dispose of a healthy animal are simply behaving according to the tradition in our culture of trashing what is no longer useful or convenient to have around."

Though executive directors do not say so, it is hard to avoid the impression that SPCAs are often encumbered by boards of directors composed of well-meaning nonactivists who serve on the boards year after year, whose interest in and knowledge of the shelters is minimal, and who believe that the agencies should concentrate on "little wanderers" rather than trying to expose and attack the broad underlying causes of animal abuse.

Another problem some shelters struggle with is disagreement among shelter workers themselves about the encouragement and screening of potential adopters. One group optimistically believes that almost any home for a dog or cat is better than none, and that the more pets adopted, the better. "We can't hold out for perfect homes," says Richard Avanzino. "Each animal should be given a chance for life."

Other equally compassionate persons see the atrocity cases that come in, the result of human cruelty, and decide that unless animals can be guaranteed good homes, they are better off being put to sleep. These people are wary of impulse adopters; they are fearful of putting animals into situations where they might be mistreated.

Shelter employees everywhere include many caring and capable people who work hard to provide the best they can for the animals. Nevertheless, a humane society in many ways can be only as good as the people of a community allow it to be. The citizens of San Francisco, for example, can be proud of its well-run, innovative SPCA headed by a director with a law degree and skill in public relations. The residents of Dallas are blessed with an SPCA shelter where a superior staff functions under the watchful eye of a former Air Force veterinarian who can often be found at the front desk at 8 A.M. Yet in supermodern Houston, with its opulent hotels, expensive homes, elegant restaurants and boutiques, there is an under-financed SPCA shelter where dogs and cats lie about in despair, or are euthanized in an old-fashioned decompression chamber. And one would hope that the residents of Indianapolis could rally to raise funds for a new structure to replace the old shelter of its humane society and its outdated city pound.

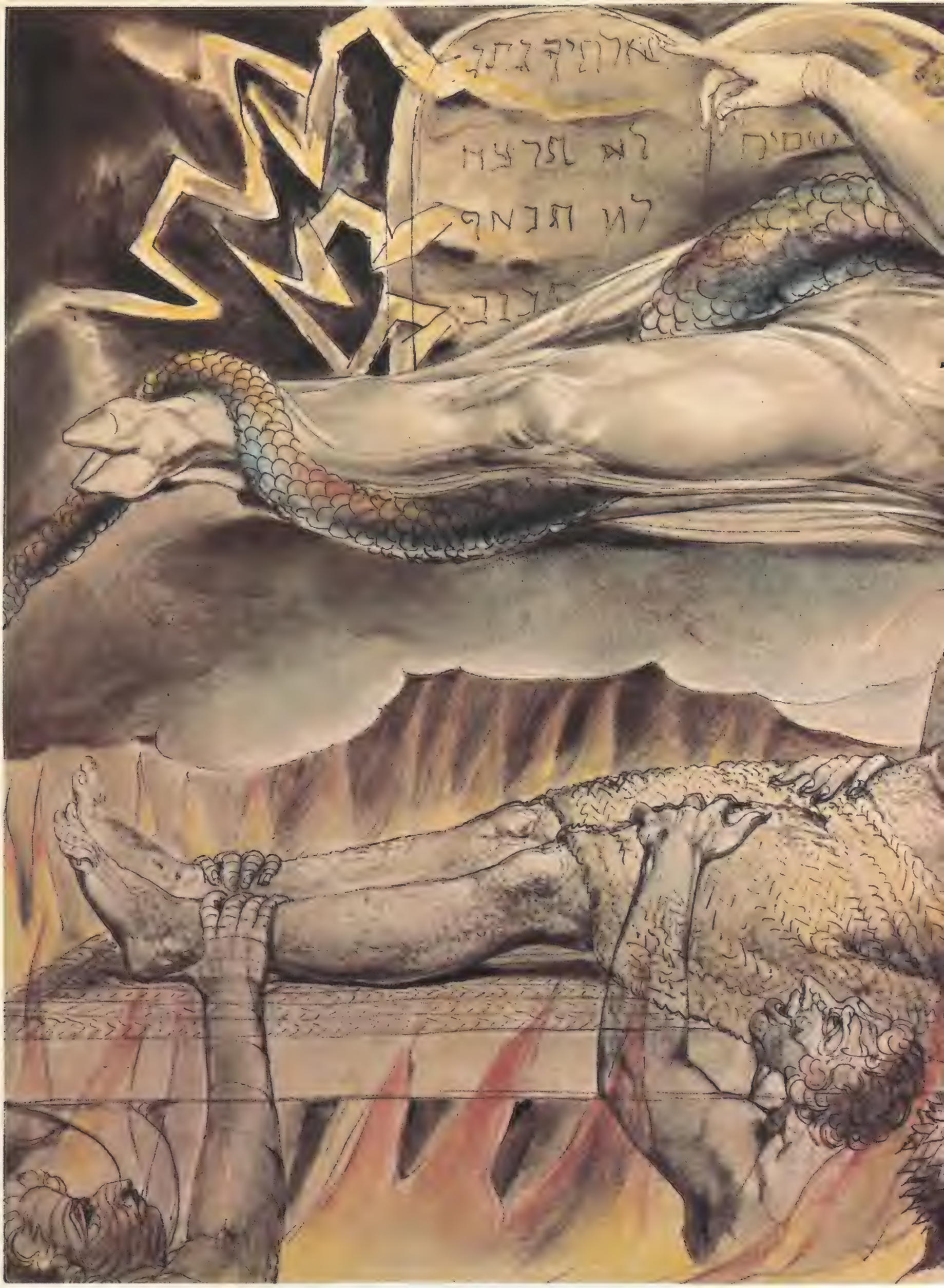
In Salt Lake City, a valiant group at the humane society tries to tender and oversee efforts on behalf of animals of the entire state and to persuade a large rural population to accept modern humane practices. But before Metropolitan New Yorkers feel superior, they should walk among the long rows of caged dogs and cats in the ASPCA shelters: the legacy of Henry Bergh is beset with near-bankruptcy, restrictive union contracts and public indifference. Three of the city's five shelters have recently been closed.

The Humane Society of the United States (HSUS) has an accreditation program to help and encourage any organization that wants to pull up its own socks and improve its level of services. Some 16 SPCAs and humane societies have voluntarily met the HSUS shelter standards, and four more are awaiting reaccreditation this year.

The situation involving animals today is not without hopeful signs. The number of strays is said to be declining nationwide; euthanasia rates are going down; spay-neuter operations are up. And there seem to be fewer pets being surrendered by their owners. "We would like people to take more responsibility for placing their unwanted pets themselves, and to see us only as a last resort," says Richard Avanzino. "When they turn to us first as the easy solution, the balance between incoming and outgoing pets is upset, making more euthanasia necessary."

Whatever the differences among shelters, one element is common to all—in the runs of the better ones and the hovels of the worst, in the cramped urban shelters and the cozy private havens. That is the look in the eyes of the animals. Dogs fling themselves, barking hysterically, at the doors of their cages. Puppies lick a visitor's fingers ingratiatingly. Cats poke their paws through the bars and desperately plead their cases. Dogs and cats that have given up hope lie with their faces to the wall. Their fate is up to us.

Kittens and cats are held in small cages in a shelter corridor while their own cages are being cleaned.



By Edward Lucie-Smith

The fiery vision of William Blake is burning bright

The inspired works of this artist and poet portray Heaven and Hell, God and Satan, with an incandescence no one has matched

Disentangling Blake often seems worse than trying to disentangle a ball of string the cat has been playing with. Yet it is also true to say that few artists of the past have such a direct appeal for people in the 1980s. There are few of us who have not been moved by his "Tyger Tyger, burning bright" (p. 58) or others of the indelibly graceful and penetrating verses from the *Songs of Innocence and of Experience*. His poetry and art speak to us as if their creator were our contemporary. Now, a marvelous exhibition, containing 250 objects, illustrates all aspects of Blake's work—his strangeness as well as his accessibility. Organized jointly by the Yale Center for British Art in New Haven (where it is on view from September 15 through November 14) and the Art Gallery of Ontario in Toronto (December 3 through February 6), "William Blake: His Art and Times" is the most comprehensive presentation of Blake's art in this country in more than 40 years.

Most prophets have commonplace origins, and it is tempting to dismiss Blake's as irrelevant to what he became. He was born in 1757, the son of a prosperous Nonconformist hosier who lived on Broad Street, off Golden Square in London's Soho. The father compromised with his religious principles enough to have his son baptized into the Church of England, at Wren's

Blake's powerful watercolor shows Job tormented by awful visions, including a Jehovah with a cloven hoof.

The visionary genius of William Blake

In *The Book of Urizen*, newly created female crouches forward over globe of life blood.

noble church of St. James's, Piccadilly. Young William is reported to have been odd from the start, and a large part of his oddity was his precocious taste for both the visual arts and poetry. At ten, he was sent to a drawing school in the Strand, where he copied plaster casts, as all novice artists were required to do. By the time Blake was 15 he had written some of the naively charming verses that were later printed in his first book, *Poetical Sketches by W. B.*, which appeared in 1783.

All this sounds as if Blake got off to a fairly good start in life, and so, in a sense, he did. Early friends included his fellow artists Thomas Stothard and John Flaxman, pioneers of the Neoclassical movement in England. Flaxman introduced him to a circle of intellectuals that included Hannah More and Dr. Joseph Priestley. London was a smaller place in those days, and it was not difficult for a young and talented man to come into contact with people who counted for something in the cultural life of the time.

There were, however, other factors that were to affect Blake's development less favorably. His well-meaning father apprenticed him when he was still very young to a widely known reproductive engraver, James Basire. Blake stayed with Basire for seven years, and the skills he acquired there were to stand him in good stead later when it came to the practical business of earning a living. But his professional background always prevented him from achieving real recognition as an original fine artist. He never learned to handle oil paint, but he did make tempera paintings in an unstable medium of his own invention. Even though he studied at the Royal Academy Schools, and in the early part of his career exhibited works at Royal Academy exhibitions, for most of his contemporaries he remained an artisan with ambitions above his station.

An everlasting love for medieval art

But his experience with Basire had its positive aspects as well. During the time of Blake's apprenticeship, Basire was working on a series of engravings showing the tombs and sepulchral figures of Westminster Abbey. Blake helped him with this work, and acquired a love of medieval art that never left him. "Gothic is living form," he declared later, anticipating that great 19th-century propagandist for the Middle Ages, John Ruskin. It was perhaps not his master's fault that long study of the art of engraving seems also to have left Blake with a distaste for direct observation. One drawing at least survives that appears to be a life study done by Blake from a nude model in the Royal Academy Schools, but there is little evidence in his more typical work that he referred to nature. His drawings, paintings and prints are images taken directly from his imagination, though sometimes meant

to illustrate literary texts—the Bible, or the poetry of Milton or Dante, or themes from his own poetry and visionary books, which have established him as a writer as well as a formidable graphic artist.

Yet one has to qualify this statement. The images may come directly from Blake's imagination—sometimes, indeed, from things he claimed to have seen and experienced in visions—but their details owe a great deal to the art Blake studied. Blake never traveled abroad, unlike his friend, the Swiss-born artist Henry Fuseli, who worked in Rome for some time before settling in England. It was before the age of photography, and Blake's chief sources for the great art of the past were therefore reproductive engravings such as Basire himself made, which rendered everything in a strongly linear way. It was from these that Blake took both compositional ideas and individual figures. The emphasis on line that one sees throughout his work is a legacy of this approach, as well as of his own training as an engraver.

The lasting influence of friends

In choosing from among the numerous artistic sources available to him, Blake was heavily influenced by the taste of his time. Like many major art movements, Neoclassicism was ambiguous. In one sense it stood for a strictly rational approach, an appeal to rules formulated by the great artists of the past—the Greek sculptors of the fifth and fourth centuries B.C., and by Raphael and Poussin. In another it was a nostalgic style, looking back to a golden age of art that never in fact existed. Neoclassicism's apparent formality and respect for academic rules scarcely conceal the upsurge of romantic feeling that was already beginning to infuse all the arts when Blake was a young man.

Some of the crosscurrents that are reflected in Blake's work can be understood by looking at two contemporary artists who were close personal friends and whose achievement affected him deeply. They have already been mentioned—Flaxman and Fuseli. Flaxman made an important career as a sculptor, but earned a much wider reputation with his illustrations to Homer, Aeschylus and Dante, which were published in engraved form from 1793 onward. These were done in outline, with little or no suggestion of depth, in a manner imitated from Greek vase painting. They established a convention that influenced Blake deeply. Fuseli, though he championed the "unattainable superiority" of Greek art and passionately admired the Elgin Marbles, was a much stranger artist—forceful, stormy, full of wild exaggerations. He is typical of the so-called *Sturm und Drang*—"Storm and Stress"—first phase of the European Romantic Movement.

Book of Urizen is Blake's Genesis. Here Los howls after giving form to Urizen, who stands for Reason.

Blake cannot, however, be understood in terms of style alone. With few artists is the actual content more important. At the same time it can seem remarkably confusing. Blake's thought is universal, yet belongs unmistakably to a particular time and place. His ideas have tremendous sweep, yet also contain much that is cranky and absurd.

The central political event of Blake's life was the French Revolution. As a young man he was in close touch with the leading political radicals of the day, the so-called "Liberty Boys," among them Thomas Paine and William Godwin (later to be the poet Shelley's father-in-law). The connection with Paine, the most antiestablishmentarian of them all, was important from a purely practical point of view. Blake played a leading role in urging the author of *The Rights of Man* to flee to France when England was becoming too hot to hold him. Blake's connection with the group

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In watercolor with pen, this is one of four known versions of *The Wise and Foolish Virgins.*

surrounding Paine earned him a reputation for being seditious, which was to haunt him.

At one point in his life Blake, always an outspoken man, was hauled into court and charged with attacking a soldier and making seditious remarks against the King, a very serious charge at the time. After a court trial, in which he was defended by counsel, he was acquitted.

Yet in most respects Blake's thought was the very opposite of that of a rationalist like Paine. Whereas Paine, following Newton, saw Nature as a mechanism that could be interpreted only by reason, Blake declared that "Nature is Imagination itself." When Blake illustrates the Bible, or for that matter Milton or Dante, he offers a commentary that often contradicts what is being said in the text. In the set of illustrations to the *Book of Job*, for example, the God who afflicts Job is at one point shown as thoroughly evil—he turns into Satan, represented with cloven hooves and with a serpent twined around his body (pp. 50-51).

Though Blake made illustrations to Dante more memorable even than those produced by Botticelli, he objected to much of the content of the *Inferno*, and particularly to the poet's orthodox views on salvation. In December 1825 Blake told his friend Crabb Robinson: "Dante saw devils where I saw none"—he saw only good. On one drawing in the series he wrote that Dante's idea of Hell was "originally formed by the devil Himself," and added: "Whatever Book is for Vengeance for Sin & whatever Book is Against Forgiveness of Sin is not of the Father but of Satan the Accuser & Father of Hell." And in the famous watercolor of *Beatrice on the Car* (pp. 56-57), Blake even seems to turn Beatrice, Dante's symbol of the Church, into the Biblical Whore of Babylon.

"My fingers Emit sparks of fire. . . ."

The intensity with which Blake worked and defended his principles rarely slackened. At the age of 43 he wrote to his friend William Haley, "My fingers Emit sparks of fire with Expectation of my future labours." Even his beloved wife Catherine, whom he married in 1782 and who outlived him by four years, remarked on her husband's unrelenting pursuit of his visionary world. "I have very little of Mr. Blake's company," she said; ". . . he is always in Paradise."

The generous, antiauthoritarian spirit that breathes through Blake's art as much as it does through his writings is one of the chief reasons why he exercises such an attraction today. Nevertheless, this attraction is frequently based on a misunderstanding. The famous design of *The Ancient of Days* (opposite), which serves as the frontispiece to Blake's own prophetic book *Europe*, is not an awestruck reflection of the wonder of the Creation, but Blake's criticism of the limiting nature of the creative act:

> And who shall bind the infinite with an eternal band?
>
> To compass it with swaddling bands? . . .

The Creator's compasses show how the world is henceforth to be limited.

In *The Book of Urizen*, perhaps the darkest of all his prophetic writings, Blake tried to show how in his view the Fall of Man and the Creation were bound up with one another. Urizen is the "primeval Priest" who rashly attempts to improve on Eternity, and reduces Eden to sterile uniformity:

> One command, one joy, one desire,
> One curse, one weight, one measure,
> One King, one God, one Law.

He falls into chaos and sleeps a "stony sleep" until Los, the personification of the poetic principle, comes to give him separate form. This is done so that Urizen can be recognized for what he is and overcome. He acquires first a skeleton (one of the most macabre of Blake's designs), then a heart and veins, and finally

The Ancient of Days, frontispiece for *Europe: A Prophecy,* blazes with stunning energy and drama.

the earthly senses of sight, hearing and taste. No sooner is Urizen complete than he starts to weigh and measure —and thus limit—what he experiences.

The Book of Urizen is a unity—one cannot separate the text from its illustrations. This is also true in a literal sense, since *Urizen*, together with some copies of *Europe*, another prophetic book produced at about the same time, is the first fully developed example of Blake's inventive graphic method where text and illustrations form part of the same plate and are printed together in color. Blake was thus reverting more or less to the principle of the medieval block book, and by producing his own writings in this way he was able to escape the control of a professional printer and typesetter. The whole process remained within his control from first to last. It was a typical, because ad hoc, artisan's solution to a practical problem—though Blake claimed with perfect sincerity that the idea of producing books in this way was first communicated to him by his dead brother Robert, speaking to him in a vision.

It is worth comparing the way Blake treats his own texts with the way he approaches the work of other, and sometimes lesser, writers. His illustrations for Gray's *Poems* often show him wrenching the given text round to serve his own purposes. In the illustration to Gray's "Progress of Poesy," the youthful god Hyperion becomes one of Blake's typical personifications of imaginative energy. On the other hand, there are occasions when Blake adapts himself to his text in an unexpected and often delightful way. A good example is the set of tiny wood-engravings made at the end of Blake's life to illustrate Thornton's *Pastorals of Virgil*. These are the only examples of his work in which landscape plays a predominant part; in one or two there are no human figures at all. The artist

Blake's *Jerusalem* took him 20 years to complete. This is the frontispiece, *Los entering the grave*.

Blake made 102 watercolors to illustrate Dante's *Divine Comedy*; here, his *Beatrice on the Car*.

renders the pastoral vision of nature with an intensity that has never been surpassed.

The Virgil illustrations call attention to something important, which is also so obvious that students of Blake often fail to discuss it. This is the way in which he uses the human figure as a vehicle for abstract ideas.

There is a certain irony in the fact that it was through these tiny illustrations that Blake exercised his most direct influence on the subsequent development of British painting. They had a formative influence on Samuel Palmer's early style, and also on the work of Edward Calvert, and perhaps even on some of the landscapes of John Linnell. It is through Palmer that Blake has a direct link with the Pre-Raphaelites of the second half of the 19th century, and Rossetti's early watercolors show distinct traces of the impact made by the Blake tradition.

Toward the end of his life, young artists brought warmth and appreciation to a Blake who had, for some years, suffered neglect and who had lived a life of scant comfort and obscurity. Like other geniuses who lived before and after him, Blake never achieved what could be termed success during his life. He had supporters, it is true, but never gained any monetary success. At one point he was forced to sell his prized collection of prints. Nevertheless, he scorned money passionately throughout his life, wrote and talked about its malign qualities and coupled it with the Devil's influence. Gradually, he fell out of the public eye and public favor. Then, in 1818 when Blake was nearing his 60th year, the group of young artists discovered him. They were Linnell and Palmer, John Varley, Edward Calvert, George Richmond and Frederick Tatham, who gathered around Blake and his wife. The group called itself the Ancients and looked with deepest affection on Blake as its mentor. It was a rewarding time for all of

In tempera with pen on a copper plate, Blake created illustration to Hayley's *Ballads*, titled *The Horse*.

The Tyger
Tyger Tyger, burning bright,
In the forests of the night:
What immortal hand or eye
Could frame thy fearful symmetry?
In what distant deeps or skies
Burnt the fire of thine eyes!
On what wings dare he aspire!
What the hand, dare seize the fire?
And what shoulder, & what art,
Could twist the sinews of thy heart?
And when thy heart began to beat,
What dread hand? & what dread feet?
What the hammer? what the chain,
In what furnace was thy brain?
What the anvil? what dread grasp,
Dare its deadly terrors clasp!
When the stars threw down their spears
And watered heaven with their tears:
Did he smile his work to see?
Did he who made the Lamb make thee?
Tyger Tyger burning bright,
In the forests of the night:
What immortal hand or eye
Dare frame thy fearful symmetry?

Blake's *The Tyger*, one of the world's best known poems, was included in his *Songs of Experience*.

them and, as it turned out, for the future of British art.

Our sense of familiarity when we look at Blake's work often rests on shaky foundations. Even where he accepts a familiar Biblical incident or story at its face value—a good example would be the splendid design illustrating the parable of the Wise and Foolish Virgins—we become aware of his avoidance of anything anecdotal. The two main groups of figures—one flattened and friezelike, the other agitated and intertwined—become two hieroglyphs expressing different states of being (p. 54). The details count for very little. The rather blank classical heads, for example, look as if they have been borrowed from line engravings after Attic grave-reliefs.

Blake still belonged to an age in which paintings were thought of as windows. Obedient to the academic rules of one-point perspective, the spectator gazed through the rectangle of the picture surface and saw a scene carefully re-created behind it. Blake did not disdain certain perspective effects. In the Virgil illustrations one finds a path or a stream that carries the eye into the distance, and the same device appears in his larger and more ambitious compositions too.

But his designs are just as often emblematic and hierarchical. The figure of Hyperion, from the illustrations for Gray's *Poems*, is later adapted for use in the series of illustrations for Milton's *Paradise Lost* (another text with whose message Blake profoundly disagreed). Here the immortal stretching his bow is a vengeful God the Father, surrounded by a circle of light. He inhabits the top half of the composition, while the defeated angels, muscular figures borrowed from Michelangelo, are given equal space at the bottom of the sheet. There is no feeling of space separating the combatants. Blake shows us recognizable beings, but gives them a purely symbolic relationship.

Of very few artists can one say that they stand completely out of their time. Though Blake brings with him the stylistic baggage of Neoclassicism, he remains totally original in his approach to what a pictorial representation can do. On the one hand he looks back beyond the Renaissance to the equally emblematic art of the Middle Ages; and on the other he looks forward to 20th-century Modernism, with its idea that any painting or drawing, whether figurative or abstract, is essentially a collision of images. The sparks struck as these images collide illuminate the meaning of the picture. Blake, a poet as well as a painter, knew that there are many meanings which cannot be strictly defined in words, and which only images can convey.

Passion and vision illuminate *Satan Arousing the Rebel Angels*, illustration for Milton's *Paradise Lost*.

WELCOME PIER 39

By Wesley Marx

A last hurrah for seagirt monuments to fun and games

Pleasure piers once strode above the waves, carrying pavilions, ballrooms and amusements; now a select few of them are being reborn

Memorialized on many a postcard, Atlantic City's Heinz Pier overlooked gambolers in the ocean surf.

The image is a common one nowadays: a pigeon confronted by slim pickings shares a dilapidated pier with a solitary fisherman, while the sand below teems with bathers taking in sun and surf to the accompaniment of windblown electronic rock music. And yet there was a time when things were the other way around—when the piers themselves were glittering fantasylands thronged by thousands who could not resist their particular allure.

Pleasure piers are among Man's more curious structures. Built at great cost and effort, they have no purposes except to let us walk a short distance over the ocean without getting sand or water in our shoes, and to provide support for other structures that could more cheaply be built on adjacent land. Their golden age is past, and most of them are gone or fallen into sagging disrepair. But a few, here and there, are enjoying a kind of renaissance, because they still tug at us in ways more easily experienced than defined.

The pleasure pier apparently originated in Britain in the early 19th century when the vanguard of coastal tourists were colonizing Brighton, Scarborough and other aborning resorts. Many of these pioneers did not come to swim; they preferred to stroll the beach to see and be seen in the latest finery. As American traveler Nathaniel Hawthorne noted: "The visitors perambulate to and fro without an imaginable object."

Pier 39 in San Francisco used to handle cargo ships; $54 million later, it has 135 shops, 14 restaurants.

Photographer put two separate shots together for this view of Million Dollar Pier, about 1910.

Could this beachside procession be provided with a more tangible goal? Piers had been built as boat landings. Why not build a pier for both boats and restless promenaders? In 1821, the Brighton Pier Company was formed to build a visionary structure that resembled a suspension bridge. As British author Anthony Hern wrote in *The Seaside Holiday*, "It was constructed by one Captain Brown, who had introduced chain cables to the Royal Navy and had cut his pier teeth on a chain pier jutting into the . . . Forth at Leith." His Chain Pier, 350 yards long, opened in 1823 as fireworks flashed over Brighton.

This hybrid pier suffered an early economic letdown when Dover's deep harbor became a more convenient cross-channel port. But revenues could be obtained from pier admission fees and concessions such as camera obscuras, which catered to ladies twirling parasols and to sleekly attired dandies. And so a pleasure pier evolved. Other resorts were quick to take notice. To British historian John Clapham, the phenomenon became infectious, " . . . no ambitious 'resort' was perfect without some such accessory."

The pier craze leapt the Atlantic to reach a zenith of sorts on a modest New Jersey sand mound. Colonel George Howard built Atlantic City's first amusement pier in 1882. A few months later, a storm demolished Howard's pioneer effort. Undaunted, he built a second pier, but a schooner slammed into it. Although the star-crossed pier was rebuilt, the city later demolished it to create more Boardwalk space.

James R. Applegate, a Boardwalk photographer, opened Atlantic City's first truly successful pier in 1884. Applegate's multidecked structure offered vaudeville as well as a parking lot for baby carriages. Captain John Lake Young and Stewart McShea, bathhouse and carousel entrepreneurs, bought out Applegate in 1891 and added a ballroom, rides and quality entertainment. Fire broke out and destroyed this prosperous structure in 1912.

Young had already raised another pier and, noting its construction costs, named it Million Dollar Pier (above). An "expert" on marine life, Young instituted a twice-a-day net haul of ocean fish. Visitors could see writhing flounder, menhaden, striped bass, shad and puffer fish. He liked his pier so much that he decided to live there and built a three-story villa furnished with chairs in the shapes of marine life. He fished from his bedroom window, the story goes, and his wife was delighted to find she could do without a dust mop. It was surrounded by formal gardens and statues. The address? No. 1 Atlantic Ocean.

Atlantic City boasted five major amusement piers throughout most of the first half of this century. They were all home to eye-catching and ear-pleasing attractions. Lillian Russell, John Philip Sousa, W. C. Fields, Milton Berle and countless big bands played to eager audiences huddled inside cavernous pier halls while outside, sun-tipped waves played to a more casual crowd. Escape artist Harry Houdini performed death-defying feats on Million Dollar Pier.

Pier owners were quick to devise spot promotions. In 1926, Gertrude Ederle was signing autographs on Steel Pier within days of swimming the English Chan-

Californian Wesley Marx enjoys marine subjects. He wrote for SMITHSONIAN *about the renaissance of commercial sail in the December 1981 issue.*

nel. One couple exchanged marriage vows in a diving bell beneath Steel Pier, where Alvin "Shipwreck" Kelly is said to have spent 49 days atop a flagpole, and Ronald C. Harrison (p. 64) spent six weeks in a glass-topped grave to protest the high prices of 1952. From a platform about 40 feet above Steel Pier, a woman astride a horse regularly dove into a water tank. Over on Steeplechase Pier, George C. Tilyou operated an assortment of crowd-pleasing rides that echoed his famous Coney Island amusement complex.

The popularity of the Atlantic City piers inspired corporate promoters. General Motors exhibited its latest automobile models on Steel Pier. On Garden Pier, Underwood displayed a typewriter more than 1,000 times the ordinary size and equipped with a bell that could be heard for blocks. At the Heinz Company pier, visitors received pickle pins for their lapels and genuine pickles for their stomachs. They could then gaze upon busts of Napoleon, Caesar, Socrates—even Michelangelo was there, along with a huge painting of Custer's Last Stand—interspersed on occasion with bottled Heinz products. By the time you left Heinz Pier, you knew what a pickle looked like!

Critics feared that a developed Atlantic City would eventually hide the ocean or disrupt the flow of sand near the shore. Such concerns did not have much impact, but in time a major economic sector became upset, too. Hotel owners inland from the Boardwalk resented having their beach vistas usurped by piers festooned with flags and electric lights. Finally, regulations were passed to ban hotels on the ocean side of the Boardwalk, and to permit no more new piers, although existing ones could be rebuilt. The last one to be constructed, Garden Pier, opened in 1913.

Across the continent, the Los Angeles area sported a trio of amusement piers at Venice, Ocean Park and Santa Monica (p. 66). The latter supported the magnificent La Monica Ballroom, set off by modified onion domes. Up to 2,500 couples could dance here, while 5,000 spectators looked on. At night, with the ballroom emblazoned in lights, the pier resembled a giant diamond stickpin set against the sky.

Did a city without an oceanfront have to forgo the pier race? Not necessarily. When architects Daniel H. Burnham and Edward H. Bennett released the monumental Plan of Chicago in 1909, they envisioned two large "piers" that would flank the mouth of the Chicago River and jut into Lake Michigan. Chicago managed to build one of them: the Municipal Pier, now Navy Pier, opened in 1916. Cargo ships could dock along its sides, which were lined with warehouses; the pier end featured a large ballroom flanked by decorative towers. Couples could hike the 3,000 feet to the pier end or hop aboard a streetcar line.

Today, a visit to the surviving amusement piers can be depressing. Lights have gone out in the ballrooms, and the thrill rides are immobile. The only life present may be pigeons at rest on a rotting deck and mussels clustered on a sagging wooden piling. A sign may declare that the pier is unsafe for public use.

Hard times for the people-pleasers

How could these people-pleasing, profit-making institutions have fallen on such hard times, particularly when people as never before flock to the shore? While joined to the land, a pier is as much a part of the ocean as a ship and, without careful design and constant care, vulnerable to the same hazards. A full-force gale destroyed Brighton's Chain Pier in 1896. During World War II, England feared that Germany would use pleasure piers as convenient landing places. Sappers—military engineers—blew up portions of several of them.

Piers built to survive hurricanes, fire and war can succumb to tiny marine animals. The wood-boring gribbles, light-colored isopods, actually subsist on pilings. For shipworms, small wormlike mollusks, a piling is a fine, rent-free shelter from predators. Some shipworms can create burrows more than three feet long and a half inch in diameter inside a piling. Throughout much of recorded history, these marine borers focused their fatal attentions on the fleets of the world; piers provided them with perfect condominiums. If you see a pared-down piling with an hourglass figure,

Text continued on page 66

High old times at Atlantic City

BOYS AND GIRLS EVERYWHERE
HOPE YOU WILL BE ABLE TO BE
DURING "CHILDREN'S WEEK"
CITY, JUNE 26TH TO JULY 3RD.
UNDERWOOD STANDARD

A promoter's dream, gargantuan typewriter really worked, to delight of Garden Pier visitors.

Pre-bikini beach fashions for 1940 were daring enough to lure the oglers out onto Steel Pier.

Celebrity Dagmar wields shovel at Harrison's protest burial. His record of 42 days didn't help the prices.

Publicity stunts with wild animals used to be sure-fire, especially with Abe Lyman providing the music.

Perhaps Atlantic City's most famous stunt was the diving horse with girl rider at Steel Pier.

A 1931 motorcyclist got up to 75 miles an hour inside the globe. Signs don't say how it felt.

On a pier in Bay Ridge, Brooklyn, lone fisherman contemplates Manhattan, hopes for a tug on his line.

Sunday visitors cram Santa Monica's amusement pier, as popular today as it was in yesteryear.

you are looking at the handiwork of gribbles. When a piling spouts leaks after a wave passes, you may be witness to the handiwork of the tunneling shipworms. Pier owners have tried coating their piers with creosote to repel shipworms, but some gribbles can eventually chew it away, letting in the shipworms.

Today people's attitudes toward pleasure piers have changed. Those who first flocked to them did not have access to swimming lessons in heated pools, or rubber fins, face masks, surfboards and suntan lotion. We now ride the waves rather than the Ferris wheels. Dancing has moved from the hard deck of the pier to the soft sands below. With the rise of electronic entertainment—television, hi-fi equipment, video games—amusement piers are left only with the kinds of attractions that do not readily fit into a motel room or lobby.

The Atlantic City piers now languish in the late afternoon shadow of the new Boardwalk casinos. Horses no longer dive off Steel Pier, which is slated to be the home of a new convention center. Nobody hands out minipickles for your lapel at Heinz Pier—a hurricane swept it away in 1944. The remaining piers support assorted rides or massive billboards that tout the virtues of brand whiskey, suntan oil and casinos.

Surfers shoot between pier pilings

Along the Southern California coast, recent winter storms have damaged the aging piers. One, Oceanside Pier, trembled beneath me as the waves passed. "This is the only pier where you can get seasick," joked a bystander. A day of reckoning approaches for Huntington Beach's 68-year-old pier (pp. 68, 69), where daring California surfers "shoot the pier"—ride between the pilings—on wave crests. If you walk beneath the beach portion of the pier, you will notice an elaborate net overhead to keep concrete chunks from landing on your skull. In the surf, pounding waves have cracked open the concrete pilings, exposing the steel reinforcing rods to corrosion. The local public-works director, Paul Cook, warns that all of the pier will have to be rebuilt at a figure that could reach $12 million.

Have we simply outgrown pleasure piers? Should they be allowed to pass away, like men's woolen swimsuits with shoulder straps? One late afternoon in Brooklyn, I passed a modest concrete pier that protruded into upper New York Bay (above). It had no visible purpose, no docked boats or thrill rides. Yet people filled its deck. A lone roller skater performed a figure eight. A boy cast a baited line into the waters. A young couple ensconced in folding aluminum chairs shared a six-pack of beer. Senior citizens watched the sun descend over the New Jersey shore. A steady procession of people arrived, circled and departed. The pier—which was in fact an abandoned ferry landing—

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FROM THE BOLLA FAMILY OF GREAT WINES.

IMPORTED BY THE JOS. GARNEAU CO., N.Y., N.Y.

had achieved a new lease on life. "This is sort of a town commons for the local neighborhood," a policeman on his break explained to me.

It was not the first time I had heard the term "commons" applied to a pier. People have proposed rebuilding Huntington Beach's aging pier, perhaps lining it with expensive restaurants and cocktail lounges. "We would lose the basic character of the pier if that happened," says Paul Cook. "We consider it a public commons." They come by day and by night, winter and summer; joggers, mothers pushing baby carriages, senior citizens with camp stools and a checkerboard, honeymooners, fishermen with poles big enough to carry sails, and fishermen who use old spark plugs for sinkers. By year's end, this particular commons will have received 1.5 million visits, offering much of what is best about the ocean—the sweeping blue vistas, the bracing air, a fish on the line, the quiet, the human scale—and without a price tag.

No wonder pier devotees can become a formidable political force. In 1937, Southern Pacific Company abandoned a lengthy pier that extended three miles into San Francisco Bay and turned it over to the city of Berkeley. Anglers colonized it. In 1955, when the city considered closing it down, a howl arose. The pier has since been partially renovated and remains a favorite fishing spot.

Piers can be self-supporting to some degree. A parking lot and about 20 lessees on the Santa Monica pier help pay the operation costs. This particular pier is also a popular location for film making. Robert Redford and Paul Newman rode its merry-go-round in *The Sting*. Episodes in television's *General Hospital, CHiPs,* and *Charlie's Angels* have taken place here. The Incredible Hulk has jumped from the pier to the beach below. (Ordinary mortals are emphatically advised not to.) The city levies a charge of about $1,000 a day for the filming.

San Francisco's Pier 39 (p. 60), tatterdemalion and obsolete, was converted into a site for restaurants and smart shops. With a carousel, bumper cars and other entertainment, it attracts about a million visitors a month. Back in Atlantic City, Million Dollar Pier is being rebuilt as an ocean liner, *Ocean One*, complete with three decks of shops, restaurants, exhibits and sports areas.

Stearns Wharf, Santa Barbara, is a Cinderella pier. After the massive oil spill of 1969, citizens conducted a sit-in to block oil-company trucks from using the pier and urged the city to take it back. The city council agreed, but later was forced to close it down. Eventually the spill itself saved Stearns Wharf. The city had sued and received a $4-million settlement. Some of this, plus insurance funds and grants from California's Coastal Conservancy and the federal government enabled Santa Barbara to restore the pier. Now, only a limited amount of commercial development is needed to underwrite costs. Half of the pier, opened in 1981, is for informal recreation; an aquarium is under construction.

The manager of Stearns Wharf sums it up: "Basically, this is a plank park to help people get together with the sea. We have a dozen small-business outlets—all local merchants, all high line." Does that mean the palm reader, a standard pier presence, is out? "Oh, no! We have Madame Rosinka, matriarch of the area gypsies. She is very well thought of here."

Stunting on a sturdy bicycle, a youngster leaps steed off the dirt in front of Huntington Beach pier.

Sun sets behind pier at Huntington Beach, silhouetting lifeguard as he keeps careful watch from tower (left).

Text and illustrations by William K. Hartmann

Mines in the sky promise riches, a greener Earth

Turning to space for our metals could solve a lot of problems. We might start out by capturing asteroids that come close to Earth

Sometime in the next few decades, astronomers will discover a small asteroid, only 500 meters across, approaching the Earth. It will not hit Earth, of course; asteroids this large hit Earth only about once every 100,000 years. The orbit of this asteroid will take it past Earth's orbit at perhaps ten times the moon's distance. Planetary astronomers, who have been using spectroscopy to determine the composition of the thousands of already catalogued asteroids, turn their equipment on this new object. It is stony iron, composed mostly of the pure nickel-iron alloy that composes many meteorites. Meteorites are fragments of such asteroids.

This little asteroid, five football fields across, contains 400 million tons of pure nickel iron, as well as 50 million tons of rocky material. About 95 percent of the metal is iron and four percent is nickel. At the 1982 price of about $3.50 a pound, the market value of the refined nickel alone would be $120 billion! The market value of the iron would be similar. The market value of the refined metals from the entire asteroid, counting additional minerals of economic interest, could be a good deal more than $300 billion.

Man has awaited this opportunity for some years. An interplanetary reconnaissance ship departs from a space station in orbit around Earth. If the asteroid has an orbit around the sun reasonably close to Earth's, the trip is easy. The total change in velocity that the ship's engines must produce could be less than the change in velocity required in the Apollo program to send astronauts from the surface of the Earth to the surface of the moon and back. In other words, the voyage to match orbits with this asteroid is no harder than the voyage to the moon, even though it takes longer. It is made still easier by the fact that no atmospheric passage is required. No aerodynamics, wings or streamlined surfaces are involved. Furthermore, developmental costs are minimal. The basic technology has been paid for by taxpayers under the auspices of earlier defense programs and space races.

The ship takes some weeks to reach the asteroid. It matches orbits, then "parks" close alongside. In this position, the asteroid's gravity will pull the ship toward its surface. The ship will be falling, but it is quite safe. The gravity is so weak that the ship will take about half an hour to fall 250 meters toward the asteroid, even without rocket braking. It can turn its landing legs toward the surface and "hit" with about the impact speed of a pencil dropped from half an inch above a table. The ship lands by falling gently onto the surface.

While the ship is maneuvering to land, the astronauts descend to the asteroid surface (opposite). Once the landing has been completed, more astronauts leap from the ship's hatch, undergoing a slow fall, or glide, of several minutes.

Astronauts float from their spaceship to a small asteroid near Earth to assess its economic potential.

A surface much like the moon's

Like the moon, the asteroid is covered with a thin layer of powdery dry soil, created during millions of years as micrometeorites pulverized its surface rocks and metal. The soil contains fragments of stone and nickel-iron alloy. Below the soil layer are more coherent rock and metal, shielded by the soil itself, but possibly heavily fractured by ancient collisions between the asteroid and moderate-size meteorites. The astronauts first sample the surface material, drill to test the depth of the soil, and conduct seismic tests to probe the deep structure of the asteroid.

Now the astronauts begin a strange task. At a selected site, they start assembling a long, spidery tower —part of an assembly called a "mass driver." The mass driver is a magnetic device something like a giant conveyor belt. It accelerates packets of soil along the tower to extreme speed and flings them off into space. The mass driver turns the asteroid into a giant rocket. Instead of expelling flaming fuel, it expels native asteroid dirt, driving the asteroid slowly forward in the other direction. Although the speed is slow, there

Pamela Lee

Gliding in the weak gravity like swimmers under water, geologists investigate the surface of a new prospect.

is a large supply of "fuel" (soil) and a lot of time. The procedure is adequate to change the orbit of the asteroid over a period of many months. Eventually the asteroid can be brought toward the Earth's orbit, can match speed with Earth, and then can be maneuvered into orbit around it (p. 75).

(Bringing the asteroid back to Earth could raise political questions. Concerned scientists have pointed out that well before we could put an asteroid into Earth orbit, we would be able to divert one to make it strike the Earth. A half-kilometer asteroid would hit with the explosive force of thousands of megatons, making it a weapon equal to all the nuclear bombs on Earth. Mining asteroids where they are and shipping the metal back to Earth presents no such problems. The scenario of bringing the whole thing back to Earth has been well studied, however.)

Once such a maneuver has been completed, the Earth has a new, though tiny, moon. More scientists and engineers from Earth-orbiting laboratories swarm to study the new satellite. Was it once part of a larger asteroid that melted, its iron draining into a central core? The melting could have been caused by the radioactive minerals that scientists now believe were common in the early solar system. Was the parent asteroid blown apart in an ancient collision? If so, when? What are the asteroid's relationships to other known asteroids and comets? What is its relationship to the meteorites that fall on Earth? As these workers finish their examination, applied researchers take over a new phase of work: asteroid mining.

The metallic ore is of excellent quality. The ancient melting of the asteroid has already completed the smelting phase that separates metal from rock. The depth of the fragmental soil layer is a matter of some excitement, because simply dragging a magnetic rake through the soil layer will suffice to "harvest" magnetic iron and nickel fragments—a mining operation of surprising ease.

Blasting or cutting would be required to dislodge coherent metal, but the asteroid may be so highly fractured that pieces can be easily broken off. Magnetic separation of valuable ore would have begun during the mass-driver operation: only the least valuable soil components were expelled as "fuel." Further refining operations might begin in giant orbital labs, powered by solar collectors, to remove valuable rare elements.

As the asteroid mining operation swings into gear, two historically important breakthroughs will have occurred. First, the population of Earth will have acquired a new source of raw materials to replace the supplies that have dwindled during our rapacious

William K. Hartmann is a planetary astronomer and a painter. His description of the imaginary planet Thraxisp appeared in the March 1982 SMITHSONIAN.

mining of the Earth's crust. Even as small an asteroid as I have described here would contain most of a year's global consumption of iron and enough nickel to supply the world's demand for 24 years.

Secondly, and just as important, the industrial *processing* of economic resources will have begun outside Earth's ecosphere. This means that instead of ravaging the Earth to obtain materials, and instead of dumping our industrial wastes into the atmosphere, streams and oceans, we can begin to let the Earth relax back to its original, less polluted, more natural state. We will be on our way from being a global society with finite limits to being an interplanetary society with vastly wider horizons.

Lots more where that came from

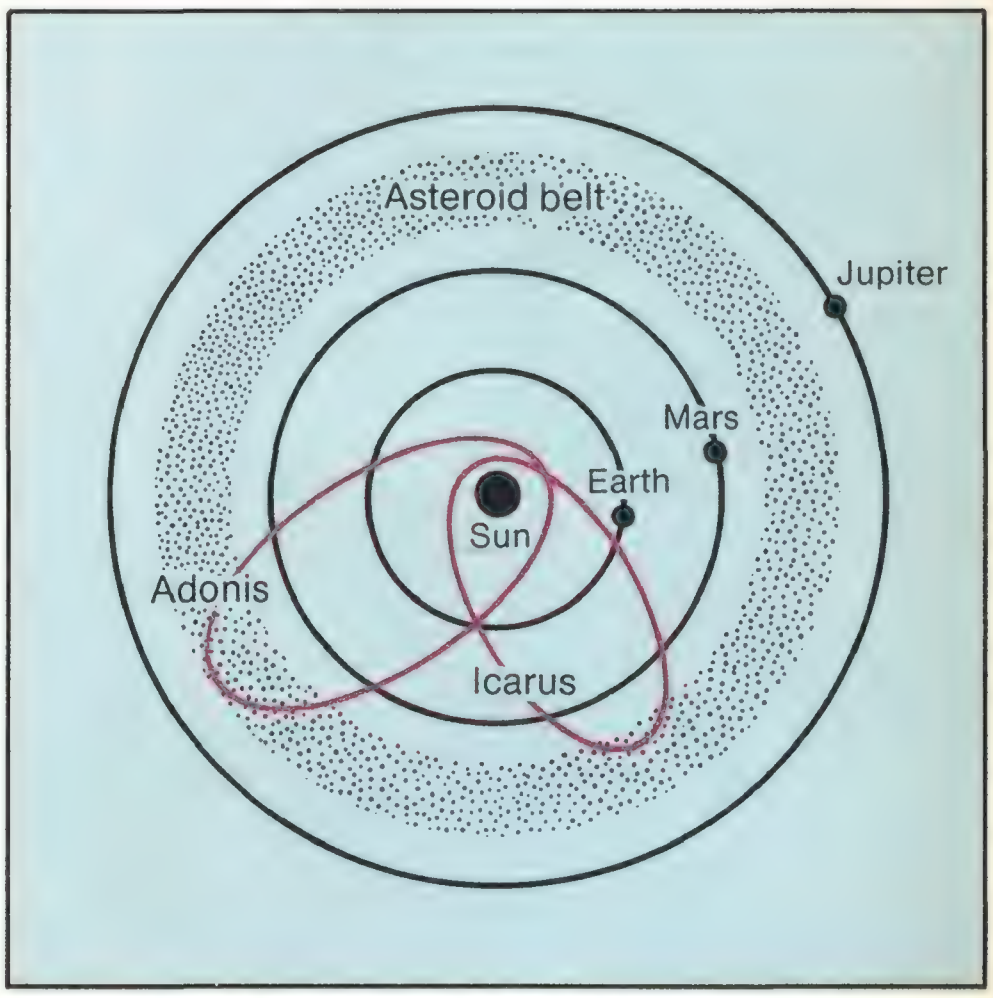
And there are many more, larger asteroids available for future exploration. Even a modest asteroid, three kilometers across, of which dozens exist in the near-Earth part of the solar system, would supply 36 times as much material as our example. In the asteroid belt, just beyond Mars, there are thousands of still larger asteroids. Some are mostly rock, and others are believed to contain large volumes of metals.

It will not be the first time asteroidal metal has been used by people. Meteorite literature contains numerous archaeological and historical examples. Eskimos, for example, used pieces of a large iron meteorite in Greenland to make metal tools. This meteorite was later moved to the American Museum of Natural History in New York by Admiral Peary (SMITHSONIAN, May 1980).

This scenario of mining interplanetary material may sound far-fetched. But the groundwork has been laid by many unheralded discoveries made during the space exploration program in the last decade or so. We have known since about the turn of the century that thousands of asteroids exist in the so-called asteroid belt between Mars and Jupiter, but now we know that dozens come much closer to Earth, some even crossing Earth's orbit. For many years it has been known that meteorites of various types—pure nickel-iron, mixtures of stone and nickel-iron, and pure stones of different compositions—fall onto Earth from asteroidlike orbits in interplanetary space. Ground-based astronomers at institutions such as the University of Hawaii, the University of Arizona and the Planetary Science Institute in Tucson (a division of Science Applications International) have used large telescopes and laboratory studies to establish that the minerals revealed in the spectra of asteroids are related to the minerals in meteorites. Thus, we can now classify specific asteroids as similar in type to specific meteorites, though some controversies remain.

The link between asteroids and meteorites has been strengthened by other studies. Studies of meteorite trajectories show that they come from orbits similar to observed orbits of Earth-approaching asteroids and debris from some comets. Furthermore, researchers such as Eugene Shoemaker and Eleanor Helin at Caltech have set up programs to search the skies for asteroids that approach Earth, like the target of the imaginary expedition in our scenario above. Although such search programs have been active for only a few years, they have already expanded the list to dozens of small asteroids that cross Earth's orbit. These asteroids are typically one to ten kilometers across. Hundreds more are believed to exist. While some of these objects may contain much metal, many of them are largely rocky material. But the minerals in stony objects have considerable economic value, also.

Clearly, objects of economic interest exist in space closer to Earth than the nearest planets. NASA planners and other scientists have already begun to explore the feasibility of exploration and exploitation expeditions such as the one described above. Experimental mass drivers have already been built. In a 1977 study at the University of Hawaii, Michael Gaffey and Thomas McCord considered a metallic asteroid of a slightly different type and larger size than the one in my example. They concluded that this object, with a



Superimposed on the orbits of Earth, Mars, Jupiter and most asteroids are the orbits of two that come close.

Braking rockets would be used to slow descent to a large asteroid, just like Apollo landings on the moon.

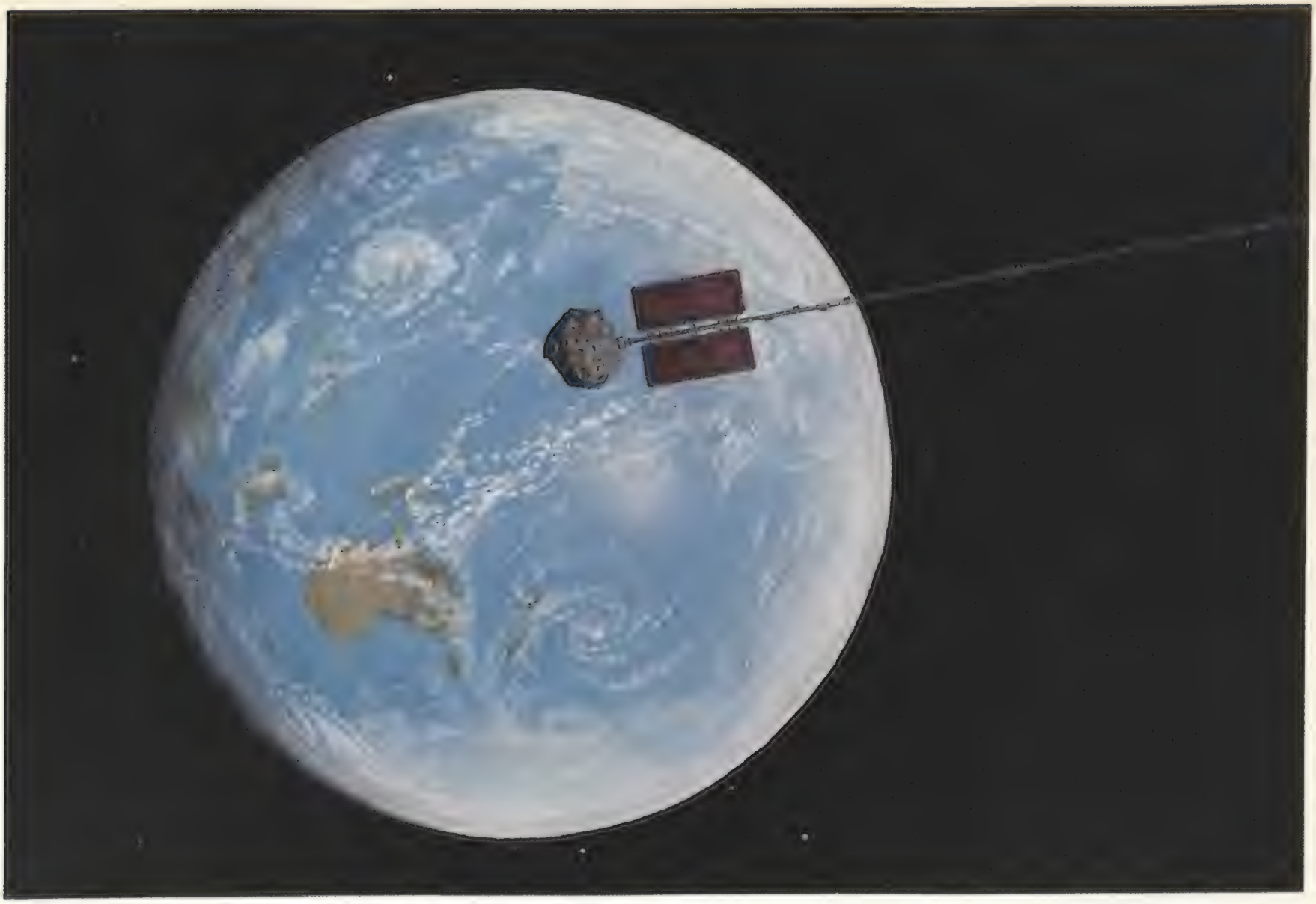
volume of one cubic kilometer, could supply the world with iron for 15 years; nickel for 1,250 years; copper for 10 years; and cobalt for 3,000 years.

Calculating the cost of acquiring such materials, and comparing that cost with the cost of mining and processing them on Earth, is difficult. The final figures depend on the assumptions. For example, if you imagine a scheme to start from scratch on Earth, build ships, develop space assembly techniques, and so on, then the costs will seem astronomical indeed. But we are already developing many of these techniques through other motivations. Both the United States and the Soviet Union are considering large permanent space stations. We can expect that within decades inhabited space stations supplied by shuttles and operating on solar energy will provide bases from which exploration and exploitation ventures can commence. It appears that the military of both countries will have a heavy hand in these programs. Part of the cost has already been paid; the challenge is to see if we can turn this investment into something productive for the betterment of humanity and the reduction, rather than the increase, of tensions on Earth.

One way of appraising the costs of the venture is in terms of energy, not dollars. This avoids arguments about inflation rates. Gaffey and McCord point out that the energy cost of smelting high-grade iron-oxide ore in a blast furnace is about 17 million joules (a joule is nearly a quarter of a calorie) per kilogram of iron produced. This energy itself comes from fossil fuels ripped from the Earth. To this figure, they compare the energy to move metal from an asteroid to a position near Earth. This ranges from five million to 100 million joules per kilogram, depending on the asteroid orbit assumed. Thus, once we have the capability to reach asteroids, we could find that some asteroids are energy-cheaper sources of iron than some ore bodies. And as we deplete high-grade ores, the energy costs for terrestrial iron will increase, making extraterrestrial resources increasingly attractive.

Putting planetary gravity to work

Some ways of bringing back asteroid material do not require rocket propulsion for all maneuvers, thus saving additional energy. In an example described by former astronaut Brian O'Leary, an asteroid is being brought here (perhaps by mass driver) along an orbit that takes it by the moon, which gravitationally deflects it in a loop around the Earth, which in turn deflects it back to a second pass around the moon, which finally deflects it into an elliptical orbit around Earth. The gravity of each world works on the asteroid as it swings by, and careful control of the initial path results in a desired final path. The technique of as-



Pitted asteroid is delivered to Earth by mass driver, the long cylinder ejecting puffs of dirt and dust.

teroid capture is called "gravity assist" and works much the same way that the recent Voyager probes were deflected by Jupiter onto orbits past Saturn.

In 1977 a NASA workshop issued a report called *New Moons,* describing the economics and technologies involved in transforming asteroids into new satellites of Earth and then utilizing their materials. Materials would not only be shipped to Earth but would be used in orbit to help expand or create new space colonies. For example, certain stone meteorites and asteroids contain water, chemically bonded in hydrated minerals. Mild heating would release the water for astronaut use. Waste soil could provide structural material or external shielding. Thus a feedback occurs. Space industry begets new space industry, and an interplanetary economy starts.

The materials are out there, and human society is almost at the point where we can (with a little leadership and daring) begin to go out and use them. There remains a philosophical issue. Should we do it? Turn-of-the-century Americans, imbued with the can-do spirit of an expanding frontier, would have jumped at the chance to exploit virtually unlimited reserves of materials for human comfort, if it made economic sense. But the environmental movement of the later 20th century has pointed out that this attitude produced two bad results in fewer than 100 years. First, voracious consumption depleted much of the world's accessible supply of important raw materials. Second, the increasing rate of processing of these materials was leading to serious environmental degradation, such as acid rain, air pollution, increases in atmospheric CO_2 that could cause climate modification and a potential threat to the ozone layer. Furthermore, aside from the strictly environmental issues, there is growing awareness that the desire of both developed and underdeveloped nations to control and consume the dwindling resources of the finite Earth leads us directly toward serious political conflicts.

These points make some people think that a concerted effort to explore and exploit extraterrestrial resources could be the best investment ever made in a more healthy ecosystem for Earth and a more stable future for humanity. But other people have just the opposite view.

Our differing perceptions of resources and pollution have hindered movement toward a solution. The reasoning in a certain part of society, especially a portion

of the environmental camp, is that pollution is caused by heavy industry and that because pollution is bad, it follows that industry is bad.

This faction of the environmental movement has made distinct contributions, including the spurring of development of domestic energy-producing and -conserving devices, from solar water-heating panels to better energy-saving architecture. Having helped to develop these small-scale technological solutions, such as rooftop solar panels, many people in this group have an instinctive concern about very large-scale technological solutions. For example, as a member of Friends of the Earth, I was asked to write a chapter on the implications of space exploration vis-à-vis environmental issues for the second edition of their excellent environmental handbook, *Progress As If Survival Mattered* (a wonderful title that gets at the heart of the issue). The editors, facing a space problem of their own, dropped my chapter from the book largely on philosophical grounds. To one of the editors, the idea of going after materials and energy in space, even if it would reduce environmental pressures on Earth, sounded too much like what he called a "disposable Earth policy": rip through what we've got here and then start despoiling the rest of the universe. The usual solution suggested is that we should reduce consumption and learn to live within the limits of the finite Earth. I agree with some of this thinking because I believe we as a society consume more than is necessary for a satisfactory life. But I would hate to lose the option of using space resources as a result of missing our current chance to develop space capabilities. If we foolishly burn through the last of our fossil resources on finite Earth, we could all be *forced*, by lack of options, to go back to subsistence farming and rudimentary handicrafts.

Utilization of asteroids is both a political and conservation issue. We will need to work out methods to make sure we do not transfer thoughtless exploitation into space.

The past decade of planetary exploration seems to be showing us that Earth is a Hawaii in a universe of Siberias. The exploration and exploitation of nearby asteroids may allow us to garner new comprehension of the history of the solar system, expand our capabilities into space, acquire new sources of metals and other minerals, begin the reduction of industrialization on Earth, and thus make a start toward an Earth with a more gentle natural and political climate for our descendants. It is certainly worth thinking about.

Some asteroids may have acquired their own satellites. Perhaps one bird will be able to capture two stones.

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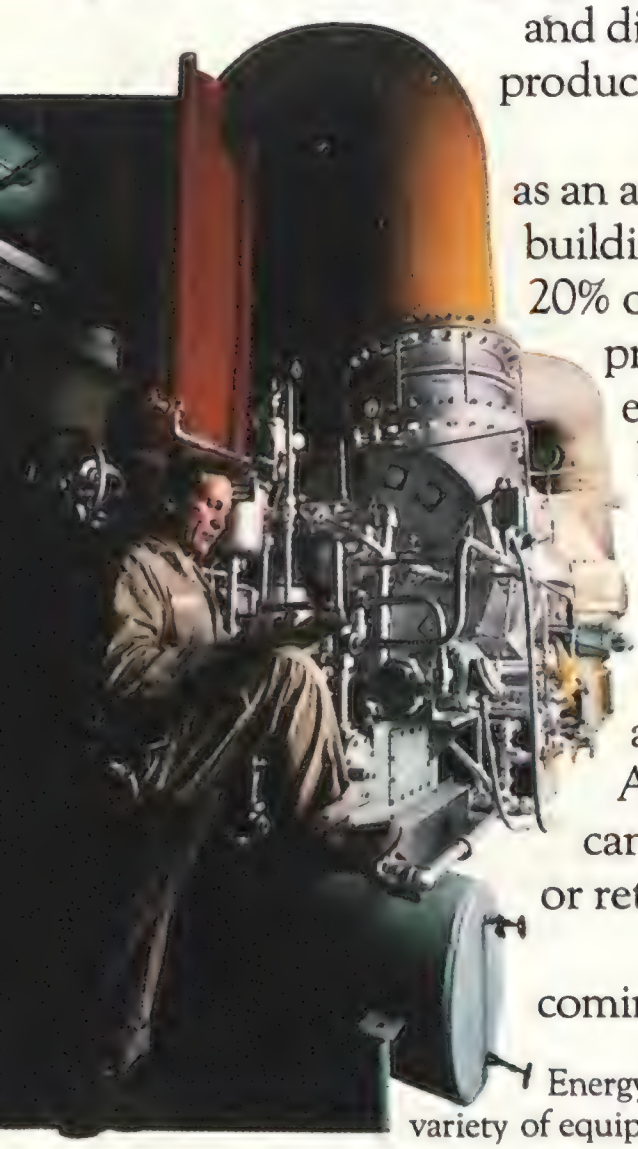

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The knowledge business

By Israel Shenker

T.S. Eliot's cats star in a slinky feline production

Gumbies and Jellicles and Old Deuteronomy frolic in a London hit based on the master's playful poems—and soon they'll pounce on us

Ailurophile Eliot diagrams a literary creation at Institute for Advanced Study at Princeton, 1948.

There may be 101 uses for a dead cat, but a show about to open on Broadway demonstrates no end of things to do with a live one. Every member of the cast plays a cat—a few, two different cats—and they sing, dance, turn cartwheels, swing from a trapeze, cavort amidst the audience, and scamper through just about every maneuver known to Man except crying over spilt milk. Ever since *Cats* opened in London in May 1981, the theater there has been sold out.

Could anyone expect anything less from a musical with tunes by Andrew Lloyd Webber, who wrote the music for *Jesus Christ Superstar* and *Evita*? Could anyone expect anything less likely from a musical with lyrics by T. S. Eliot (above), celebrated high priest of literary criticism, Nobel laureate of literature, panjandrum of mien severe and judgment pontifical? "Pope Eliot," Dylan Thomas called him. "Mr. Eliot," Ezra Pound wrote in 1930, ". . . has arrived at the supreme Eminence among English critics largely through disguising himself as a corpse. . . ."

Eliot departed this life in 1965, ponderous with honors, all but beatified—and ever so prematurely, for in spite of some catcalls here and there, the posthumous verdicts would have been poetry to his ears. *The Daily Telegraph*: "*Cats* is the cat's whiskers. *Cats* is the cat's pyjamas."

Only a rapid eye can take it all in. John Napier, who collaborated on *The Life and Adventures of Nicholas Nickleby*, has produced a huge rubbish dump of a set, debris inflated to cat's eye view, enormous cast-away tires, great rotting boards, an outsize wreck of a car, vast bicycle wheels, gargantuan shoes, even giant-size toothpaste tubes. From the firmament, like a planetarium spinning out of control, cats' eyes flash, polychrome smoke billows. The narrative line is so thin that it can be ignored—and is, right from the first shake and jiggle, pounce of claw and creep of paw. Dancers in punk-rock wigs, painted body stockings and rehearsal leg warmers spin through classical ballet and jazz steps, tap dances and jetés, somersaults and splits, prepared to caterwaul the night away:

> Jellicle Cats come out to-night,
> Jellicle Cats come one come all:
> The Jellicle Moon is shining bright—
> Jellicles come to the Jellicle Ball.

To direct the show, Lloyd Webber got the eminent Trevor Nunn, artistic director of the Royal Shakespeare Company, a man of demonstrated acumen when it comes to the Bard, but of uncertain mettle

Bonnie Langford played Rumpleteazer (left), John Thornton was Mungojerrie in London cast.

Excerpts and entire poems from COLLECTED POEMS 1909-1962 and OLD POSSUM'S BOOK OF PRACTICAL CATS by T. S. Eliot are reprinted by permission of Harcourt Brace Jovanovich, Inc.; copyright 1936 by Harcourt Brace Jovanovich, Inc., copyright 1939, 1963, 1964 by T. S. Eliot, copyright 1967 by Esme Valerie Eliot

The Rum Tum Tugger

The Rum Tum Tugger is a Curious Cat:
If you offer him pheasant he would rather have grouse.
If you put him in a house he would much prefer a flat,
If you put him in a flat then he'd rather have a house.
If you set him on a mouse then he only wants a rat,
If you set him on a rat then he'd rather chase a mouse.
Yes the Rum Tum Tugger is a Curious Cat—
And there isn't any call for me to shout it:
For he will do
As he do do
And there's no doing anything about it!

The Rum Tum Tugger is a terrible bore:
When you let him in, then he wants to be out;
He's always on the wrong side of every door,
And as soon as he's at home, then he'd like to get about.
He likes to lie in the bureau drawer,
But he makes such a fuss if he can't get out.
Yes the Rum Tum Tugger is a Curious Cat—
And it isn't any use for you to doubt it:
For he will do
As he do do
And there's no doing anything about it!

The Rum Tum Tugger is a curious beast:
His disobliging ways are a matter of habit.
If you offer him fish then he always wants a feast;
When there isn't any fish then he won't eat rabbit.
If you offer him cream then he sniffs and sneers,
For he only likes what he finds for himself;
So you'll catch him in it right up to the ears,
If you put it away on the larder shelf.
The Rum Tum Tugger is artful and knowing,
The Rum Tum Tugger doesn't care for a cuddle;
But he'll leap on your lap in the middle of your sewing,
For there's nothing he enjoys like a horrible muddle.
Yes the Rum Tum Tugger is a Curious Cat—
And there isn't any need for me to spout it:
For he will do
As he do do
And there's no doing anything about it!

when faced with cats. Confessing that he feels a "faint unease in the presence of felines," Nunn has suggested optimistically that cats might well "allow us more clearly to see ourselves."

His associate director, Gillian Lynne, choreographer of a show in which the dancing rarely stops and only fitfully slows, joined others in auditioning more than a thousand performers—in Glasgow, Manchester, Bristol and Birmingham as well as London. "There are lots of wonderful dancers who can't sing," she concluded, "and lots of wonderful singers who can't dance." Those selected took most of their characters from the poems in Eliot's *Old Possum's Book of Practical Cats.* (Two of these, with illustrations from the costume designer's drawing board, appear in full above.)

In London, Graham Fletcher, on leave from the Royal Ballet, dances the role of Mr. Mistoffelees, the Original Conjuring Cat:

The Old Gumbie Cat

I have a Gumbie Cat in mind, her name is Jennyanydots;
Her coat is of the tabby kind, with tiger stripes and leopard spots.
All day she sits upon the stair or on the steps or on the mat;
She sits and sits and sits and sits—and that's what makes a Gumbie Cat!

But when the day's hustle and bustle is done,
Then the Gumbie Cat's work is but hardly begun.
And when all the family's in bed and asleep,
She tucks up her skirts to the basement to creep.
She is deeply concerned with the ways of the mice—
Their behaviour's not good and their manners not nice;
So when she has got them lined up on the matting,
She teaches them music, crocheting and tatting.

I have a Gumbie Cat in mind, her name is Jennyanydots;
Her equal would be hard to find, she likes the warm and sunny spots.
All day she sits beside the hearth or on the bed or on my hat:
She sits and sits and sits and sits—and that's what makes a Gumbie Cat!

But when the day's hustle and bustle is done,
Then the Gumbie Cat's work is but hardly begun.
As she finds that the mice will not ever keep quiet,
She is sure it is due to irregular diet;
And believing that nothing is done without trying,
She sets right to work with her baking and frying.
She makes them a mouse-cake of bread and dried peas,
And a *beautiful* fry of lean bacon and cheese.

I have a Gumbie Cat in mind, her name is Jennyanydots;
The curtain-cord she likes to wind, and tie it into sailor-knots.
She sits upon the window-sill, or anything that's smooth and flat:
She sits and sits and sits and sits—and that's what makes a Gumbie Cat!

But when the day's hustle and bustle is done,
Then the Gumbie Cat's work is but hardly begun.
She thinks that the cockroaches just need employment
To prevent them from idle and wanton destroyment.
So she's formed, from that lot of disorderly louts,
A troop of well-disciplined helpful boy-scouts,
With a purpose in life and a good deed to do—
And she's even created a Beetles' Tattoo.

So for Old Gumbie Cats let us now give three cheers—
On whom well-ordered households depend, it appears.

He is quiet and small, he is black
From his ears to the tip of his tail;
He can creep through the tiniest crack,
He can walk on the narrowest rail. . . .

And not long ago this phenomenal Cat
Produced *seven kittens* right out of a hat!

"I'd been spiders, pigs and potatoes, but never cats," says Fletcher. "The knack with being a cat is not to start washing behind your ears, or licking your paws. The knack is to be a cat as a human being, which is far more difficult."

Angela Richards plays Grizabella, the faded Glamour Cat:

She haunted many a low resort
Near the grimy road of Tottenham Court;
She flitted about the No Man's Land
From The Rising Sun to The Friend at Hand.

Elaine Paige played Grizabella, the Glamour Cat who has seen better days. She sang *Memory*.

"I think of the other members of the cast as cat people, half cat, half person," Richards says. "I think of my hands as paws, and listen from side to side."

What would self-deprecating T. S. Eliot have made of it all? "He is very yellow and glum," wrote Harold Nicolson, diplomat, Member of Parliament and diarist. "Perfect manners. He looks like a sacerdotal lawyer—dyspeptic, ascetic, eclectic. Inhibitions. Yet obviously a nice man and a great poet." "Pale, marmoreal Eliot . . . ," Virginia Woolf observed, "like a chapped office boy on a high stool, with a cold in his head, until he warms a little, which he did. . . . 'The critics say I am learned and cold,' he said. 'The truth is I am neither.' "

Eliot himself provided another self-portrait:

> How unpleasant to meet Mr. Eliot!
> With his features of clerical cut,
> And his brow so grim
> And his mouth so prim
> And his conversation, so nicely
> Restricted to What Precisely
> And If and Perhaps and But.

And—but these were not Eliot's words—intelligent, erudite, ironic, sardonic, skeptical, cynical, urbane, moralistic, diffident, patrician, snobbish, obscure, faultless in dress and decorum and speech, royalist and God-fearing. And a whale of a poet, who revolutionized English poetry, joining classical to contemporary, scholarly to colloquial, transcendent to trite. Poet Stephen Spender wrote of "a shift in sensibility, from a subjective concern with the poet's self to an objective one with the values of a civilization endlessly created in men's minds. He wrote a new, a really new poetry, which set up connections with the old, the really old." Virginia Woolf said Eliot wrote "some of the loveliest single lines in modern poetry" but it required acrobatics to leap from line to line.

Early struggles of the poetic life

He descried poetic originality in an amalgam of disparate, unlikely material, and he himself was a man of parts. Thomas Stearns Eliot was born in St. Louis (1888), descendant of English stock that emigrated to America in the 17th century. While at Harvard the young scholar struggled against shyness, went to dances and parties and even took boxing lessons. He went to Paris, back to Harvard, then moved on to Oxford. In England he struggled to make a living, taught briefly, then went to work in the foreign department of Lloyds Bank, supplementing an initially meager income after bankers' hours with pittances from criticism and reviews. In 1915, *Poetry* magazine published "The Love Song of J. Alfred Prufrock," lithe and mysterious and lilting:

> Let us go then, you and I,
> When the evening is spread out against the sky
> Like a patient etherised upon a table;
> Let us go, through certain half-deserted streets,
> The muttering retreats
> Of restless nights in one-night cheap hotels
> And sawdust restaurants with oyster-shells;
> Streets that follow like a tedious argument
> Of insidious intent
> To lead you to an overwhelming question. . . .
> Oh, do not ask, "What is it?"
> Let us go and make our visit.
>
> I have measured out my life with coffee spoons.
>
> I grow old . . . I grow old . . .
> I shall wear the bottoms of my trousers rolled.

Israel Shenker free-lances from his home in Scotland. He wrote on the solution to the Masquerade *puzzle in May 1982* SMITHSONIAN.

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Thus J. Alfred Prufrock, thus Eliot, who was taken up by Ezra Pound, gifted craftsman of poetic meter, eccentric champion of brother talents, who helped Eliot edit *The Waste Land* (1922) into a confirmation of poetic mastery. "April is the cruellest month," *The Waste Land* begins, and Eliot was to proceed, triumphantly, to the final words (1925) of "The Hollow Men":

> *This is the way the world ends*
> *Not with a bang but a whimper.*

In the same year he was finally emancipated from bondage to Lloyds and emerged as a director of the publishing firm that became Faber & Faber. There he worked happily as an editor, thoughtful, considerate, encouraging gifted writers. The company prospered, the poetry thrived. To a disillusioned postwar generation, Eliot's verse appeared to convey not only a quick sense of the potency and resonance of language, but also an aura of sexual maladjustment and resigned despair. Drearily snarled in life's dismal round, his creatures trembled with tenderness and embraced failure.

Eliot was hopelessly mired in a miserable marriage to an attractive woman as lively and playful as he was deliberate and sedate. His wife showed ever-increasing signs of mental disturbance, and finally the couple separated, though the marriage was never dissolved. She died in 1947.

This was the year before Eliot was awarded the Nobel Prize for literature, and Britain's prestigious decoration, the Order of Merit. In 1927 he had become a British citizen, having long appeared, from bowler to brolly, more British than the British. Caught up in the cultural ferment of his adopted land, he edited a literary review, branched out into plays (*Murder in the Cathedral, The Cocktail Party*), and "succeeded," as poet and novelist Richard Aldington said, "in doing what no other American has ever done—imposing his personality, taste, and even many of his opinions on literary England."

Since the English are batty about beasts, Eliot had no trouble foisting on his compatriots his pleasure in cats of all stripes, even "allegorical cats, metaphorical cats," as in "Prufrock":

> The yellow fog that rubs its back upon the window-panes,
> The yellow smoke that rubs its muzzle on the window-panes. . . .

Explicitly, with greater abandon and lighter touch, Eliot wrote cat verse to his godchildren. Eliot, of course, had lived with a cat in residence. It was named Pettipaws and, according to Eliot, dominated the establishment. Of Pettipaws, he wrote that its "insistence on eating nothing but rabbit is going to bring us to penury. . . ." Pettipaws may well have been of uncertain antecedents. This was consistent with Eliot's lack of regard for pedigreed cats. He once wrote to a correspondent: "I condole with you on the death of your Cat and rejoice with you over the acquisition of a male successor. I have always held that the best cats were likely to be of obscure origin. Pedigree cats are no good, stupid, nervous and of feeble character. The common cat, on the other hand, is either good or bad, but is apt to be a cat of strong character. . . ."*

The many lives and names of cats

Eliot liked inventing cat names: Pouncival (Arthurian), Sillabub (one part silly, one part Beelzebub). There was Macavity, the Mystery Cat; Old Deuteronomy, who has lived "many lives in succession"; and Growltiger:

> His manners and appearance did not calculate to please;
> His coat was torn and seedy, he was baggy at the knees;
> One ear was somewhat missing, no need to tell you why,
> And he scowled upon a hostile world from one forbidding eye.

Gus, short for Asparagus, was the Theatre Cat:

> His coat's very shabby, he's thin as a rake,
> And he suffers from palsy that makes his paw shake. . . .
>
> For he once was a Star of the highest degree—
> He has acted with Irving, he's acted with Tree.

In 1939 Faber & Faber brought out *Old Possum's Book of Practical Cats*, Possum being a pet name that Eliot answered to.

Lloyd Webber recalled the book from his childhood.

*Extracts from uncollected letters are reprinted by permission of Mrs. Valerie Eliot and Faber & Faber Ltd. © Valerie Eliot 1982

In 1977, like other composers before him, he began setting the verse to music, and in 1980 performed it at a concert. In the audience was Valerie Eliot, the poet's second wife. She had been his secretary; when they married he was 68 and she almost 40 years his junior. Eliot's second marriage appeared as blissful as his first was disastrous.

Mrs. Eliot brought Lloyd Webber unpublished cat poems, such as "Grizabella: the Glamour Cat," whose history Eliot had thought too sad for children. She also gave him a rough draft of what was to be the opening poem in a dog-and-cat book, and an Eliot letter which spoke of cats going "up up up past the Russell Hotel, up up up to the Heaviside Layer." This suggested a climax for a theatrical evening: Grizabella ascending to heaven.

Lloyd Webber persuaded Mrs. Eliot that he was not interested in pussycats, but, rather, in humanoid, earthy creatures; and Trevor Nunn (joined in places by Richard Stilgoe) added eight lines to *The Song of the Jellicles*, composed a prologue incorporating lines and ideas from the unpublished *Pollicle Dogs and Jellicle Cats*, and from Eliot's 1915 "Rhapsody on a Windy Night" and other Prufrock-era poems composed the lyrics of *Memory*, crooned by Grizabella (and also recorded by Barbra Streisand).

Whenever Eliot felt ill or was unable to sleep, he would recall cat poems and recite them under his breath. One biographer said that under the razor of his second wife, who used to shave him, Eliot would chant popular music-hall lyrics such as "Too many gins give the ladies double chins." Enthusiastic about ballet and music hall, he had wanted to write a play punctuated by the beat of drums. Is it too much to believe that when *Cats* opened a Proud and Jellicle Tomcat, with features of clerical cut, and mouth so prim, broke into song and sang along, up up up in the Heaviside Layer?

They are Eliot's cats, they are people, too—
here assembled, the whole motley crew.

By A. B. C. Whipple

Storms the angry gods sent are now science's quarry

Once ascribed to the violent deities, hurricanes and typhoons are scanned from satellites, chased in flying labs

During summer months over the sun-warmed Atlantic, a patch of hot, humid air may be rising skyward at any moment. Its low-pressure wake sucks in more air, which becomes heated in turn and joins the updraft. This phenomenon is known as a "tropical depression" —not a lack of tourists in the West Indies but the meteorologists' term to characterize a weather breeder of the worst sort.

From June to November, these tropical depressions frequently form over the Atlantic just above the Equator. And the National Weather Service, at its Hurricane Center in Miami, Florida, monitors all of them—because, although most tropical depressions will simply slog along on a generally northwest course, bringing beneficial rain to the crops and cisterns of the West Indies and the Bahamas, perhaps one out of five will intensify into a full-fledged hurricane. The rising column of warm moist air, cooled at a higher altitude, will condense into huge clouds that spread outward from it. The storm's center will become a sort of chimney, and the air rushing inward will start to whirl, in a counterclockwise direction in the northern hemisphere because of the Earth's rotation. This whirlwind will accelerate until the tropical depression has become a much more formidable cyclonic storm, a maelstrom of driving rain and winds above 74 mph (sometimes well over 300 mph). In the western Pacific such a storm is known as a typhoon; in the Atlantic it is called a hurricane.

The first warning usually comes from an orbiting weather satellite transmitting portraits of the Earth beneath its path. The hurricane clouds give it away: usually a dense pattern swirling around the core of the storm. Other reports soon come in, from floating weather stations, from ships near the storm, from weather watchers—some with radar—on the islands in its path. The most precise data are shortly provided by the famous "hurricane hunters," the daring men who go out in their flying laboratories and plunge right into the hurricane to measure its location, wind speed and pressure pattern.

Studying their findings, the Miami meteorologists plot the track of the hurricane and start sending out the warning advisories that will be issued at regular and frequent intervals until the storm has followed a course off the East Coast of the United States out to sea, or smashes ashore on the coast. As these modern meteorologists analyze the hurricane—sometimes two or three storms at a time—they bring to their evaluations the invaluable findings of other weather watchers who for two millennia have observed, puzzled at and slowly come to understand this killer storm, the most widely destructive of all weather phenomena.

Punishing images of the gods

It is understandable that early civilizations blamed storms on the gods, praying and sacrificing to them in hopes of abating their violence. More than a millennium before the modern notion of hurricanes was understood, Asians attributed storms of all sorts to a variety of weather gods. Ancient Chinese mythology had a separate god for wind (Feng Po) and for rain (Yu Shih), as well as an enormous dragon god (Lung Wang) whose breath stirred up storms and to whom the temple priests could pray for respite, which they did by fashioning his image in wood and paper. Once when Lung Wang failed to stop an incessant downpour, Cantonese priests imprisoned his image for five days, evidently in the hope that he would think twice next time. Rain gods were also invoked to ease droughts. And the Japanese had a pragmatic punishment for their god if he did not respond: when their entreaties brought no rain, they tossed his image into the parched fields to give him a taste of the drought.

In the New World the Maya revered a god of cyclonic storms whom they prophetically called Hunraken; the Quiche Indians refined the name to Hurakan. The most famous weather mythology was that of the Greeks, with Zeus' thunderbolts, Poseidon's tem-

An ancient Japanese storm god, drumsticks in his fists, is depicted in this 19th-century scroll detail.

Greek god Aeolus (left) changes weather by releasing winds he kept imprisoned in cave on his island.

pests and Aeolus' bag of winds (above). It was the Greeks who were the first to apply their logical minds to the scientific origins of storms. They could be called the first meteorologists.

The transition from superstition to science was epitomized in the 40-foot-high Tower of the Winds in ancient Athens. On each side of the octagonal structure was a representation of a mythological wind god; on top was the earliest known weather vane. Sundials, and a water clock inside the tower measured time. Indeed, the word "meteorology" came from the Greeks, who combined *meteora* (atmosphere) and *logos* (study) to describe discussions of celestial affairs. Aristotle gave the title *Meteorologica* to his exhaustive four-volume study of what had been learned about the weather before the fourth century B.C. And Aristotle's disciple Theophrastus published a *Book of Signs* that offered 50 ways to forecast a storm and other portents. One of them later became a sailor's byword: "The plainest sign is that which is to be observed in the morning, when, before the sun rises, the sky appears to be reddened over; and it indicates rain." The mariners' summation of this wise advice was "Red sky in the morning / Sailors take warning." As later meteorologists proved, a red dawn sky is caused by a diffusion of sunlight by a humid atmosphere, foretelling rain.

Meteorological study suffered a long drought with the decline of Greece. The Romans added little, though the Greek-invented weather vane swung to the winds atop many a Roman villa. And the dark era of religious superstition in the Middle Ages added little more, beyond prayer to saints instead of gods. Everyone respected and feared stormy weather, but no one asked how and why it happened.

That remained for an unlikely amateur meteorologist. Grand Duke Ferdinand II of Tuscany was a member of Italy's Medici family, and he spent much of his fortune on his hobby of meteorology. Among his major contributions to the science was to take in the famous Galileo Galilei (SMITHSONIAN, August 1981), who by 1640 was blind, virtually crippled from his tortures during the Inquisition, and near death. Nonetheless, he had invented a forerunner of the thermometer: a tiny glass flask with a long, thin neck. Warming the flask in his hand, Galileo submerged its neck in a dish of water; when he removed his hand, the air inside the flask cooled and contracted, and water from the dish rose in the neck of the flask. But this device was woefully inaccurate in measuring actual temperature. Part of the reason, of course, was that it was also registering the weight of the atmosphere on the water in the dish.

It was a protégé of Galileo's attracted to Ferdinand's court, Evangelista Torricelli, who in 1644 found a way

Galveston hurricane flattened Texas island, killing 6,000 when it swept out of Gulf of Mexico in 1900.

Japanese thunder god riding the clouds and beating his ring of drums decorates a 19th-century lacquer box.

to measure the atmosphere's weight, with the prototype of what is probably the meteorologist's most important single instrument: the barometer. Torricelli simply filled a glass tube with mercury (it was then called quicksilver), held his finger over one end and submerged the other end in a basin also containing mercury. When he removed his finger, the mercury in the tube did not all drain down into the basin; some of it remained suspended, as it were, in the tube (p. 92). And over a period of time its level was observed to rise and fall.

Why? The force that held the mercury in the tube, Torricelli explained, "comes from outside. On the surface of the liquid in the basin presses a height of 50 miles of air." Atmospheric pressure, in short, not only was forcing the mercury up the tube, but raising it to different levels with variations in pressure. Torricelli's barometer thus provided the first means of measuring these changes in pressure, which later meteorologists would find essential in foretelling alterations in the weather, the most important being the approach of a storm. In explaining the workings of his invention, Torricelli also succinctly described the most significant factor of Man's existence in the Earth's atmosphere: "We live submerged at the bottom of an ocean of elementary air."

In the atmospheric deep of this vast ocean, the early meteorologists continued their quest. Another weapon was added to their armory by an Englishman named Robert Hooke, who less than a quarter of a century after Torricelli's barometer came up with the anemometer. This instrument was a small metal plate on a pivot that measured on an attached scale the degree to which the plate was moved by the wind. It was not so accurate as the spinning cups of today's anemometers, but the principle was established.

Now the major implements of the hurricane hunter were at hand: the thermometer, the barometer and the anemometer. But the quarry was not yet in sight. The cyclonic storm was still to be named because it was still to be identified and its special characteristics described. What manner of storm was this devastating combination of rain and wind that swallowed ships and inundated coastal areas? Identifying the hurricane and typhoon took more than a century, and the combined work of an unlikely trio composed of pirate, philosopher and harness maker.

Captain William Dampier was on a voyage of exploration and freebooting when in July 1687, off the

A. B. C. Whipple wrote about battles with raccoons, and their natural history, in the August 1979 SMITHSONIAN. *This article is adapted from his book,* Storm, *published this summer by Time-Life Books.*

Galileo's protégé Torricelli performs an experiment with his new barometer in 19th-century engraving.

coast of Hong Kong, he was overtaken by a storm that seemed to come from the northeast: at least that was the direction from which the raging winds blew. Next morning the wind suddenly died, though the storm-whipped seas still "tossed us about," Dampier later wrote, "like an Egg-shell." Just as suddenly the storm again howled down on Dampier's battered ship—"altogether as boisterous," he recalled, and so fierce that Dampier was forced "to run before the Wind very swift, tho' only with our bare poles." But this wind was from exactly the opposite direction. Dampier had heard of similar storms on the other side of the globe, in the West Indies, where they were called "hurricanes." The Asians called these similar storms "tuffoons." But what caused their amazing 180-degree shift in the wind?

It was more than 50 years later before another observer came a bit closer to solving the mystery. Benjamin Franklin at 37 was not yet the Sage of Philadelphia; it would be a few years, in fact, before he would launch his famous kite to test the electricity of a thunderstorm. But he was already an eager, shrewd student of the weather. On October 21, 1743, he was looking forward to an eclipse of the moon at 9 P.M. That night, however, a violent storm blotted out the sky over Philadelphia. Franklin's disappointment changed to surprise when a few days later he read in the newspaper that the eclipse had been seen in Boston. The sky was clear over that city on the night of the 21st; not until next day did the storm strike. So, Franklin reasoned, the storm had moved from Pennsylvania to Massachusetts in a northeasterly direction.

Intrigued by this discovery, he studied the reports of storms in other cities, compared dates and times, and came to the conclusion that a storm is not necessarily a broad pattern of wind and rain. It could be a small self-contained system traveling across the countryside, and in his part of the country it appeared usually to move in a northeasterly direction.

A puzzle Franklin couldn't solve

But in the storm on the night of the eclipse, Franklin remembered, the wind had blown *from*, not *toward*, the northeast, as it should have if it were sweeping over Philadelphia toward Boston. Seven years later he was still puzzling over the problem, writing to a friend that the wind direction must have something to do with the pattern of a storm. He was on the verge of discovering the cyclonic form of a hurricane. But he never made the breakthrough. Nor was the mystery solved for nearly another century, when the answer came to a saddle-and-harness maker.

William C. Redfield of Middletown, Connecticut, was a self-taught amateur meteorologist who had been

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TWO THOUSAND

interested in hurricanes ever since his father had been lost at sea when William was 13. In the autumn of 1821, Redfield set off on his route through New England in pursuit of his trade. A hurricane had swept over the area that September, and as he rode northwestward he studied the devastation. The wind of the "great September gale," as New Englanders had called it, had come from the southeast when the storm passed over Middletown. So Redfield was not surprised to see most of the uprooted trees lying with their tops headed northwest, away from the wind. But when he reached western Connecticut, he was astonished to see the fallen treetops pointing in the opposite direction: southeast. Clearly the storm that had brought winds from the southeast to Middletown had struck this area only 70 miles away with winds from the northwest.

The anatomy of a whirlwind

The only logical supposition, Redfield realized, was that the hurricane was a massive whirlwind. Like Franklin, Redfield collected all the data he could, from ships' logs as well as newspapers. He interviewed ships' captains, traced wind patterns on huge maps, and after ten years of study decided that his supposition had been correct. Finally, in 1831, he published in the *American Journal of Science* a compelling anatomy of the cyclonic storm, an enormous whirlwind swirling in a counterclockwise direction with a small central calm area (later to be called the "eye") that could mislead storm victims into believing that the storm had passed when its equally punishing second half was still to follow. Despite winds sometimes exceeding 100 mph spinning around this center—and thus from the southeast or northwest—the hurricane itself usually moved along at about 30 mph. With William Redfield's breakthrough, the one-eyed killer had at last been identified. Now it had to be tracked.

The telegraph, perfected by Samuel F. B. Morse in 1844, was the first tracking device with a speed greater than a moving storm. By 1860, under the auspices of the Smithsonian, some 500 volunteer weather observers across the United States collected data that were telegraphed daily to the Institution, which published the information and posted a daily weather map. The Civil War forestalled reports from the Southern states, and so nationwide forecasting was disrupted. But at war's end another storm tracker was on the trail.

His name was Cleveland Abbe, and his first contribution was a private weather service from Cincinnati. The daily forecasts, which Abbe modestly labeled "probabilities," were bulletins offered to the public. And by 1870, storm tracking finally became official. That year Congress authorized the Army Signal

Thermometer experiment is performed at Florence science academy for patron Grand Duke Ferdinand II.

Corps to build a nationwide storm-warning network. (An earlier attempt to set up such a department had been denounced by Congressman, and former President, John Quincy Adams as "crack-brained" and it failed in Congress.) One of the first to join the new weather bureau was Cleveland Abbe.

The infant service produced its first weather map pinpointing a hurricane in 1874. By 1890, the organization had achieved independent status as the U.S. Weather Bureau. And it soon proved its value during the Spanish-American War. President McKinley reportedly ordered the Weather Bureau's chief to add a special hurricane-warning service, explaining that "I am more afraid of a West Indian hurricane than the entire Spanish Navy."

Still, the killer remained hard to track. Atlantic hurricanes were—and are—elusive, erratic and often unpredictable. A 1900 hurricane went into the Gulf of Mexico, evidently headed straight for the wilderness of the Mexican jungle, then unexpectedly veered north toward the low-lying island city of Galveston, Texas. It was too late for Galvestonians to flee to higher ground on the mainland, and 6,000 died when the hurricane swept over the entire island (pp. 90-91).

World War II helped hurricane tracking take a giant

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Air Force WB-29, flying weather laboratory, was part of the hurricane-tracking service begun in 1944.

step, with an important new weapon, radar, and the military incentive to learn more about the behavior of storms. It also produced one of the most important hurricane trackers of them all, Joseph Duckworth.

He made his major contribution virtually by accident. As a colonel in the U.S. Army Air Corps, his chief interest was instrument flying. Colonel Duckworth was stationed at Bryan Field, Texas, where he was instructing Air Corps recruits in instrument flying. The conventional wisdom of the time was to land at the first sign of a storm and stay on the ground as long as there was zero visibility. But Duckworth believed that airplane instruments had become sophisticated enough for a trained pilot to fly in storm conditions, and he realized the significance of this advantage in time of war. One day in July 1943, he saw his chance for dramatic proof.

Reading a weather report that a hurricane was heading ashore over Texas from the Gulf of Mexico, Duckworth persuaded navigator Ralph O'Hair to join him in an experiment. They took off in their single-engine AT-6 trainer and headed for the storm. The little plane bounced through the fringe winds into heavy clouds that turned day into night. With no visibility and relying solely on his instruments, Duckworth fought to keep the craft aloft while the hurricane's winds bounced it nearly out of control, sending it sideslipping and plunging hundreds of feet. Then the plane suddenly leveled out in a calm, clear sky. Above them was sunshine; below, they could see the Texas countryside. They were in the eye of the hurricane.

Then, just as suddenly, darkness closed in again and the AT-6 went on another roller-coaster ride through lashing torrents of rain. Shortly they emerged from the storm; navigator O'Hair got his bearings and they flew back to Bryan Field. They were met by Lt. William Jones-Burdick, the base weather officer, whose reaction to their exploit was to express disappointment at missing out on the historic flight. Duckworth told him to hop in, and the AT-6 took off and flew through the hurricane again. Lurching about in his safety harness, Jones-Burdick managed to record a few observations of temperature, air turbulence, cloud thickness and barometric pressure before Duckworth calmly flew out of the maelstrom and back to the base.

Ever since Joe Duckworth's seemingly madcap but momentous flight, weather experts have flown through hurricanes to gather information on these murderous storms (pp. 98-99). Today weather satellites spot every major disturbance as soon as it forms. Radar stations pick it up when the storm approaches land, and computers rapidly churn out projections of its progress and probable course. But the greatest amount of information still comes from the lumbering turboprop "hurricane-hunter" planes that have been converted into flying laboratories to study the storm from the inside as they roar through its churning winds and driving rain.

The reason, of course, is that while most of the modern measuring devices study the storm from a distance, the hurricane-hunter plane takes its own measuring instruments right into the storm's midst. With the orbiting weather satellite, for example, no hurricane is born unseen; the satellite's cameras, however, do not even photograph the hurricane itself, but the distinctive cloud pattern above a cyclonic storm. Most of the vital statistics of the newborn hurricane can be recorded only by the instruments inside (and sometimes mounted on the wings of) the hunter plane. It is from this multitude of statistics (so many that the weather-service experts could not handle them without help from computers) that meteorologists have constructed the modern model of a hurricane.

Clouds spinning like a top

It is an awesome natural structure. Around the fringes of the enormous whirlwind, gale-force winds spin out like sparks from a pinwheel. At the outer rim of the hurricane, where the hunter plane begins to dance about, its instruments record a massive increase in moisture content; and the men aboard the plane can see the soaring clouds that give the hurricane its circular shape. In a full-blown cyclonic storm, these clouds are already spinning like a gigantic top in the punishing winds, whose velocities the hunter plane's instruments measure. Deeper inside the storm, these

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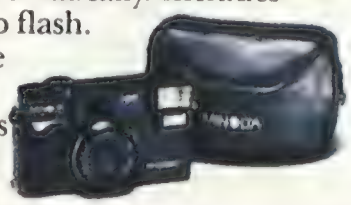

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clouds thicken and spin even faster, their speed increasing as the plane penetrates the whirlwind. The instruments also register a rapidly declining barometric pressure, which drops precipitously from the hurricane's rim toward its core. As the pressure falls, the temperature rises and precipitation increases. And in the hot, howling, rain-lashed inner circle of swirling clouds, violent updrafts soar skyward from the warm ocean waters below.

The hurricane's revolving heat engine is at its peak of deadly efficiency, sending out enormous energy like a monstrous natural turbine. At the vortex of this spinning wheel is the hurricane's eye—virtually still but with the highest temperatures and the lowest barometric pressure of all. Inside this calm core, the hunter plane's occupants often look up at a blue sky and down on a sea in turmoil from the surrounding winds. Sometimes there are birds swept into the center to circle around in their cage of clouds.

This anatomy of a hurricane, visible to the hurricane hunters, exposes the storm in more detail than meteorologists on the ground could achieve with all of their devices. Yet it also reveals questions hitherto unposed. Precisely how all these natural forces are triggered, for example, is still a mystery. Nor is it yet possible to forecast the changes in the hurricane's erratic path. Still, by attaining a greater understanding of the internal makeup of a hurricane, meteorologists have in recent decades been able to estimate its potential destructiveness.

With the improvement in forecasting, death tolls from hurricanes have been dramatically reduced. But property losses have not; in fact, they have risen—not because of a lack of warning but largely because of a drastic and risky increase in coastal construction (SMITHSONIAN, September 1980).

Although we think of hurricanes as giant wind storms, which indeed they are, it is really the storm surge along the coast and flash floods in river valleys that account for most of the damage and death toll. More than 90 percent of the deaths during hurricanes

Skyward view from eye of typhoon through a fisheye lens shows the storm-hunter's engine at lower left.

are caused by drownings in the storm surge, the rise of water and wave action that engulf a shoreline.

Another reason why property loss has increased is the fact that while satellites, hurricane hunters and computers can follow and measure a storm, they can do nothing to ameliorate it. Not that some scientists have not tried. The most promising attempts—seeding the clouds with silver iodide to widen the eye of the storm and thus slow the winds near the center—were undertaken in the late 1940s through the '60s. Projects Cirrus and Stormfury performed this experiment a number of times, but the attempts were abandoned after questionable success and equally questionable charges that cloud seeding had made two hurricanes at sea turn toward land. Hurricane seeding has been halted until more effective methods can be found. Modern meteorologists can only track the killer; so far, nobody yet has figured out how to tame it.

By Ann Pearce

The prized golden horses of Venice have come indoors

With disintegration imminent, the stallions of San Marco were rescued, restored. Facsimiles soon will take their place on basilica's facade

After 700 years of presiding over the joys and sorrows of Venice from a loggia high on the facade of the Basilica of San Marco, four magnificent gilded bronze horses have come to earth to find sanctuary from the pollution that has been destroying them. Henceforth, they will prance for citizen and visitor alike within the Museo Marciano.

Through the centuries there has been lively conjecture about when and where these masterpieces of classic sculpture, the only quadriga known to have survived intact from antiquity, were fashioned. Greece? Rhodes? Chios? Rome? The answer eludes us still. What is known is that their peregrinations—for they

Back in Venice at tour's end, horses are rearranged as they stood for centuries on Basilica of San Marco.

Discreetly caparisoned to protect their refurbished surfaces before exhibition in Milan, San Marco's golden horses stand in classic quadriga formation, heads of center horses turned in, flanking heads turned out.

Doge presents shell-borne quadriga to seated Venice in Renaissance-style rondel. Victory flutters above.

Detail of Gentile Bellini's *Procession in Piazza San Marco* shows team above basilica's main portal in 1496.

have been shunted around Europe half a dozen times, either as spoils of victory or for safekeeping in two World Wars—are at an end.

Looking out over the Piazza San Marco, the dynamic horses have been symbols of civil pride and glory, but also a monument to Enrico Dandolo, the medieval doge who presented them to his beloved city. For they were his most treasured spoils when, an octogenarian and blind as well, he led a Venetian fleet to conquer the Byzantine empire at Constantinople.

So often exquisite works of art have been touched by greed and cupidity, chicanery and exploitation. The horses are no exception. In A.D. 1202, Venice was owed a sizable debt by the knights of the Fourth Crusade. The city had contracted to build them a fleet and man it for an assault on Moslem infidels in the Holy Land, but when all was ready the Crusaders could come up with little more than two-thirds of the cost. The wily Dandolo, to recover the balance, maneuvered them into taking Constantinople, wealthiest and most beautiful city of Europe, a center of culture and learning. ("My lords," he told them, "there is in Greece a country that is rich, and well supplied. . . . If we could only find a reasonable excuse to go there and take what we need. . . .") Also, he had a score to settle with Byzantium—in 1171 thousands of Venetians living there had been imprisoned and their property seized, and in 1182 they were victims of a full-scale massacre.

Even Attila the Hun, in the fifth century A.D., had been daunted by Constantinople's fortifications. The Venetian flotilla of 200 ships carrying 25,000 men sailed up the Dardanelles in July 1203. Crusader Geoffrey de Villehardouin noticed that those seeing the city for the first time "gazed very intently . . . having never imagined that there could be so fine a place in all the world. They noted . . . its rich palaces and tall churches, of which there were so many that no one would have believed it to be true if he had not seen it with his own eyes. . . ." Contemplating the 14 miles of walls and towers guarding all this opulence, he mused that "there was indeed no man so brave and daring that his flesh did not creep at the sight."

Rich treasure and real estate

There was an initial successful assault, then nine months of skirmishes, pillage and back-and-forth political scheming. In April 1204, following a ferocious battle, the majestic city surrendered. After the slaughter and the burning, attackers filled three churches with plunder. Dandolo's share was three-eighths. Hundreds of beautiful artifacts were shipped back to Venice—enamel plaques, ivory altars, rock-crystal chalices, pearls and emeralds, marbles and bronzes. Best of all were four gilded bronze stallions,

Napoleon's troops subdue protesting Venetians while carting the beloved horses off to Paris in 1797.

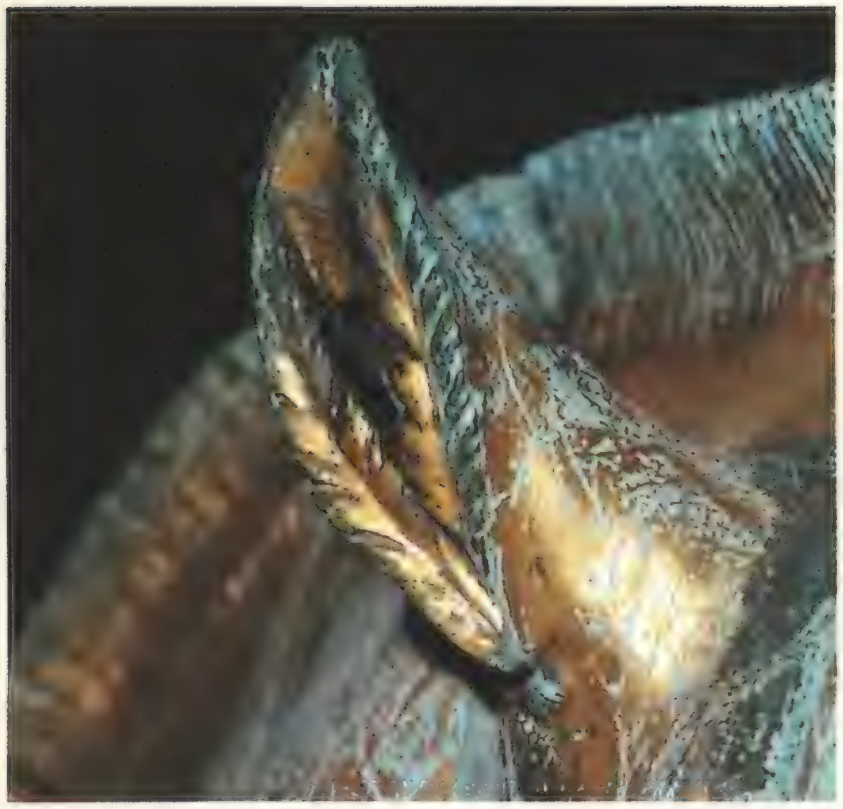
glorious survivors from antiquity even then, a quadriga intended to pull the chariot of an emperor or a god. They had graced the Byzantine capital, probably in its fabled racecourse, the Hippodrome. One theory is that they were brought from Rome by Emperor Constantine in the fourth century A.D.

At the time Dandolo and the Crusaders set out for Constantinople, Venice was a trading and maritime power to be reckoned with—the same empire that had sent Marco Polo on his way to distant China (SMITHSONIAN, April 1982). In addition to his art treasures, the doge acquired enough real estate—three-eighths of the city, the port of Gallipoli, the west coast of Greece and the wealthy city of Adrianople—to make Venice dominant in the Eastern Mediterranean for three centuries to come. The old patriot was not on hand to receive the gratitude of his people—he had died in Constantinople. But, from a specially prepared loggia his golden horses, their bits broken off to unbridle their strength, became to Venetians synonymous with the power and majesty of the Most Serene Republic. To Venice's periodic attackers, they were objects of envy and desire.

Through the centuries Venetian artists—Gentile Bellini (opposite), Carpaccio, Canaletto, Francesco Guardi—and many from other lands have included the horses in their paintings. Illustrious visitors have written about them: Petrarch in 1364 ("On their high place they look almost alive, whinnying and stamping"), Goethe, Stendhal and Winckelmann. To John Ruskin they were "symbols to Europe of the destruction of the Greek Empire by the Latins. . . . The horses of a Greek quadriga . . . [their] chests extend themselves into the fullness of their golden strength." Generations of tourists have clambered out onto the loggia for a close look and a quick snapshot. As the emblem of Italy's leading hotel chain, they are embossed in gold on its letterhead and menus.

But in the past 20 years it has become increasingly apparent that they were threatened, suffering from bronze disease, a pernicious form of corrosion. Under the gilding some of the rich copper alloy was turning to powder. Eventually holes would appear, legs would buckle, details blur and the horses disintegrate. Accelerating air pollution was the chief culprit. Venice pays a high price for warm houses in winter, year-round industry just across the lagoon, the speedy gasoline-driven water buses and motorboats that are replacing its historic man-powered gondolas.

The city's location was a major contributor to the problem. All those picturesque canals ensure high humidity. Heavy, chemically saturated, corrosive condensation settled on the horses. One proposed remedy was to set up, behind them, ordinary household fans to



Double row of hairs in horse's ear is similar to those of Marcus Aurelius' horse, second century A.D.

Treatment of tuft on fetlock joint of gilded stallion typifies both Greek and Roman equine sculpture.

blow away the moisture. It did not work. Only removal, treatment and relocation indoors could save them.

In 1974 the first horse was lifted down gently and carried to a laboratory inside the basilica for a series of delicate and sophisticated tests. Photogrammetric studies plotted its contours so that a copy could be made without resorting to plaster casts—for facsimiles must replace the golden horses on San Marco's facade. Radiography, spectography, micrography and X-ray diffraction all told tales and furnished clues.

Finally, treatment began. Damaging chloride and sulfate salts were identified, then corrosive deposits were loosened with compresses soaked in ammonium tartrate and potassium oxalate and softly brushed away. Each horse was washed with a surfactant, given a stabilizing alkaline treatment and a final distilled-water rinsing. Solutions pumped into its cavities dissolved and flushed dirt, mold and soluble salts from the interior. Gradually, as encrustations and zebralike stains were removed, the horses' gilt glowed afresh.

Such treatment, however, is only half the battle. The long-range solution calls for a protective coating. Various synthetic resins and waxes are being subjected to rigorous tests to find one that will not only stave off further corrosion but can be removed, if and when necessary, without damage to either bronze or gilt.

Although the horses' history from the Middle Ages to today is well documented and they rank among the world's most celebrated works of art, mystery and polemics cloud their origin.

Until recently, the horses' simplicity, beauty and strength lent weight to a scholarly consensus that they were of Greek origin. The authoritative *Blue Guide to Northern Italy* ascribes them to the fourth century B.C., "Greek work of the time of Alexander or just after." Some scholars have quoted Pliny's *Naturalis Historia*, which mentions a "Quadriga of the Sun made for Rhodes" by Lysippus. Surely, they reasoned, this is the quadriga of San Marco. Twenty years ago a German archaeologist believed he had found proof of this theory. In the sanctuary at Delphi he compared markings on a marble base with the position of the San Marco hoofs, and translated an inscription on the pedestal as "To Apollo from the people of Rhodes."

But recent appraisals have been weighted on the side of a Roman origin, that they were created to adorn a triumphal arch in the waning days of the Roman empire. Technical analyses show the bronze alloy to be about 98 percent pure copper, with one percent each of tin and lead. The technical difficulties of casting such an alloy suggest the late imperial period. And details such as the stylized treatment of ears,

Rome journalist Ann Pearce's article on the Riace bronzes appeared in the November 1981 SMITHSONIAN.

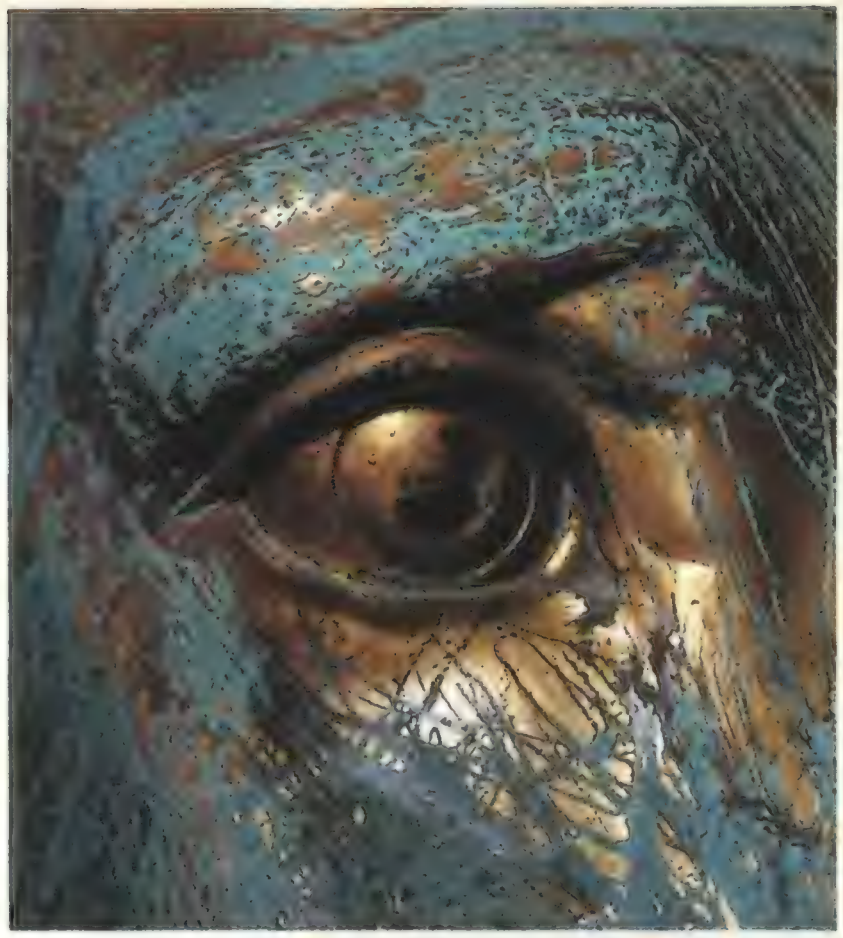
hooves (opposite) and nostrils are comparable with Roman sculpture of the second and third centuries, such as the magnificent horse of Marcus Aurelius, which stood in the Campidoglio in Rome until its recent removal for treatment of its own bronze disease.

Even those who believe the horses were created in Roman times credit artistically superior Greeks then living in Italy with forming them. Gisela Richter, an authority on Greek art, says they are "probably a Roman work inspired by a Greek masterpiece from the second half of the fifth century B.C."

Why, when pure copper is so difficult to use, was it chosen? The purer the copper, the easier to gild—and the horses' surfaces had been pocked and pitted by escaping gas during the casting process. Study with a scanning electron microscope revealed initial gilding with mercury-gold amalgam, a technique not used extensively until the third century A.D. Then layers of gold leaf were added, pressed on and burnished.

A network of deep scratches punctuating the gilding has puzzled experts. Goethe thought that "barbarians, not content with stripping the gold off, used chisels instead." Now, electron-scanning images have shown that the scoring was done soon after gilding, before any corrosion appeared, with a special tool having a cutting edge of eight-tenths of a millimeter. Pressed forward, it scored the surface neatly in a thin, straight line, right through the gold and into the copper. Had it been used to gouge or scrape, the scratches would have been irregular and blurred.

But why gild and regild to produce a golden shimmer and then score the surface to reduce its effect? Perhaps to accentuate the modeling, as when an engraver uses hatching to heighten contrast and give depth, or perhaps to eliminate the glare of bright sunlight on smooth golden surfaces.



Lunula, half-moon device in eyes of horses, occurs in Roman sculpture of second to fourth centuries.

There is indication that the graceful tails, so saucily arched and bound, may once have had ornamental tips.

Off to Paris with Napoleon

Just as the horses had watched over the rise of the powerful Venetian trading empire, so they were witness to its decline. Napoleon, conqueror and rapacious collector, subdued Italy in 1797, then had the finest works of art from the Italian peninsula packed up and sent to Paris. From Venice went 20 priceless paintings, 500 manuscripts, the winged lion of San Marco from the Piazzetta and the four golden horses (p. 103). Napoleon's triumphal procession was led by the quadriga. The horses batted around Paris a bit before the imposing Arc du Carrousel was ready to receive them in 1807. Atop the arch, they were accompanied by two winged victories and a chariot. (Napoleon, however, drew the line at a statue of himself driving.)

After Bonaparte's downfall, when the Congress of Vienna redrew the political map of Europe and estab-

Going down—in 1942, to safety of remote wartime refuge, antique horse is ridden by larking workman.

lished Austrian hegemony over Venice, Emperor Francis I of Austria, to Parisian indignation, decreed the horses' return. In December 1815, in the presence of the Emperor and Prince Metternich, arbiter of post-Napoleonic Europe, the horses were welcomed back to Venice by an ecstatic populace, with parades, banners, drums and celebrations.

During the two World Wars of this century they have been lowered and carted off to safety—in Rome in 1917, and to the Benedictine abbey at Praglia in the Euganean hills in 1942. A former director of San Marco once said that "Each time these horses are moved, an empire falls," citing ancient Rome, Byzantium, Venice, Napoleon, Austria, Mussolini and the Third Reich. But the world has run out of empires, and now the horses have come down from their loggia for the last time.

After testing and cleaning, one horse was sent off—under the aegis of the Olivetti Corporation—on a triumphal tour of museums in London, New York, Mexico City and Paris, as the focus of an exhibition of equine sculpture, prints and drawings, painted Grecian vases, Roman coins, Renaissance playing cards. Late last year the city of Milan asked to display all four horses, now restored, in its Palazzo Reale. The President of Germany issued an invitation and crowds in Berlin's Martin Gropius Hall marveled at them. Now in temporary quarters in the tiny former church of San Basso, next door to San Marco, the bronzes are admired at close range by 750 visitors a day.

Meanwhile, safe within the basilica's Museo Marciano, a permanent—and air-conditioned—home is being prepared. Within the next few months the horses will take their place among the Doge Dandolo's other treasures from Byzantium. On the loggia above the main portal of San Marco, four costly ($20,000 each) replacements will watch over the piazza—as soon as a way is found to keep their modern gilding from turning to dross in the polluted air.

For their Milan and Berlin appearances, the horses were regrouped as a proper quadriga (pp. 100-01), the central duo with heads turned toward one another as though about to nuzzle, the flanking horses seeming to strain forward, heads turned outward—an arrangement which suggested power and movement. To the Venetians this was nonsense, if not heresy. For centuries they and, it is said, the golden horses of San Marco have been content with the traditional, paired grouping. So that is how they stand in San Basso—and so they will remain.

Going up—in 1982, to basilica's loggia, facsimile is watched anxiously by Venetians in Piazza San Marco.

By Roger D. Abrahams

Celebrations mark great occasions the world around

A major exhibition at the Renwick Gallery shows how we and other cultures have similar ways of noting the big moments in our lives

National Gallery of Art, Washington

On the American frontier, neighbors had to join forces to carry out certain large-scale seasonal tasks.

How much of our lives is given over to using conventional objects and actions without thinking about where they come from and what they mean? To ask our friends and neighbors what a stoplight means, or why we shake hands when we first meet someone, is to guarantee getting a "What-does-this-guy-really-want" response. The meaning of these things or actions, after all, was learned so early in life that it does not seem useful or interesting to discuss the matter except perhaps with children.

Yet it is precisely such simple questions about our own everyday objects and conventional actions that those who conceived the two-part exhibition "Celebration: A World of Art and Ritual" wanted the viewers to ask of themselves. (The first part opened at the Smithsonian's Renwick Gallery on March 17 and will run through July 10, 1983; the second part opened August 26 and will run through February 21, 1983.) By taking powerful, and often beautiful, common objects from the cultures of the world and setting them beside those of our own—such as bridal gowns and bouquets, autographed baseballs and World Series programs—the creators of this show hoped to bring new understanding to the practices of others.

Moreover, through exhibitions such as this, we can ask big questions of ourselves. For example, how threatening is the commercializing of Christmas or Easter? The message of life's continuity is maintained in both of these holidays, but in different forms and images. Christmas, in the face of the dead season, underscores continuing life in the verdant images of the holly, the mistletoe, the evergreen; the related ideal of a vital light emerging in the midst of the dark season is dramatized in the Yule log, the tree lights, the Star of Bethlehem, the candles. With Easter, the symbols of the egg, the bunny and the new spring outfit underscore the theme of regeneration. And always we seize on such themes and heighten them through ornamenting the natural objects, such as the beautiful painted

Photographs by Kim Nielsen

These "bees" combined work with fun and feasting. *The Flax Scutching Bee* (1885) by Linton Park shows one such, where men and women are scraping flax with scutchers to separate out the woody stalk.

Easter eggs we have inherited from Central Europe (p. 112). But even if we choose to buy these objects rather than make them ourselves, the plastic holly bough, the tinsel tree or the chocolate egg are common images that remain potent and instantly recognizable. (If we feel we have lost something in substituting these new materials, we must ask ourselves what it is. Must all festive objects still be of the perishable sort, as they have in the past?)

Although most of us are no longer firmly tied economically and socially to the passage of the agricultural year, we have clung nevertheless to many of the observances of the past, transforming them into special weekend events. We look to these as times when social and economic inequalities may be given up, when gifts are exchanged and ties renewed as community of spirit becomes more important than anyone's social standing. It is true, however, that most modern festive

Fairs celebrate the harvest and its products, but along with pigs and pumpkins—pretty girls.

events have become detached from natural processes and are no longer directly connected with work. Yet they have maintained their traditional connections to a time when agriculture, in particular, was what most people worked at. Festivals commonly acknowledge the reproductive powers of nature and the place of humankind in enhancing that process of renewal. When "things" of nature become a part of a festive display by being dressed up in some way, creativity is linked to the life-giving forces of nature.

From such a perspective, the ethnographer can usefully ask how different is the dancing of giant yams, resplendent in dressed-up human finery, among the Abelam of Papua New Guinea, from the ceremony of the Cherry Blossom Festival with which "natives" of Washington, D.C., welcome the spring? There *are* major differences, of course. Washingtonians do not rely upon the cherry and its blossom for the continuation of community and culture. Moreover, these have little to do with any work done in Washington, while the yam festival directly expresses the basic economic and social life of the Abelam.

Yet at a deeper level, these differences are not so great; perhaps the more profound message of the cherry blossoms is that in a complex world economic system, symbols of renewal do not have to be indigenous to carry an important message. Indeed, the gift of the cherry trees by Japan in 1906 not only continues to comment on the coming of spring, it also corresponds to the enduring work of such important members of the Washington community as the diplomat and the politician.

Identification with natural resources

To most of us, the dressing-up of the yam among the Abelam seems exotic, evidence of a primitive nature religion (p. 117). But we see the very same process in a great many of our own popular cultural expressions, especially those emerging in parades. Is the tall figure of Uncle Sam on stilts in a July 4 parade all that different from the stilt dancers in a West African cult observance? And is the spirit of the giant yam so very dissimilar from what we see on floats and other magnified displays in Thanksgiving or New Year's Day parades? We too *blow up* things (both by enlarging and exploding them).

It is the sense of identification between people and their primary natural resources, yams or whatever, that mark harvest festivals throughout the world. These festivities call the people together for nothing more complicated than to celebrate life itself, and are times when participants dress up for the sake of feeling new, revived and whole (at least for the moment).

Festivals build an experience which everyone at-

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Any egg can symbolize Easter, but decorated ones —like these from Czechoslovakia—are more festive.

Pedro Celestino de Arce's carving is of a type used in Puerto Rico for the Feast of the Three Kings.

tending can share equally, for everyone may be swept up by a surge of surprise and delight. Thus, most festivals begin with a bang, literally—with a loud noise like drumming, firing guns, setting off firecrackers—and most of us respond not only with adrenalin but its attendant lifting of spirits.

Painting up, dressing up, stitching things together —these are at the center of the creativity of such events. The everyday objects of work, past and present, are changed by carrying them around as nonfunctional items for display. This may mean stylizing them, blowing them up, distending, stuffing or miniaturizing them. Moreover, we enter into the same distorting process physically by eating and even drinking to excess.

It is interesting to look at the variety of ways in which cloth is used symbolically in this highly charged environment. Take that most festive of symbols, the flag. The old-fashioned Fourth of July speeches explicitly spelled out the "meanings" of Old Glory, the Stars and Stripes, and the Red, White and Blue. These alternative names not only describe the flag's features, but focus on the assigned meanings of these colors and shapes, as they summarize American history (from the 13 colonies in the stripes to the 50 assembled states in the stars), symbolize our values (red for hardiness and valor, white for purity, blue for vigilance), and epitomize our highest national ideal (out of the many, one). In such circumstances, the organizing power—the wholeness—of the flag speaks for itself, and must be protected as it is celebrated. It must not touch the ground, for instance, and it must always be handled with dignity.

But look how it can be torn apart and reassembled in other contexts on July 4: for use as bunting for the speakers' platforms, as the motif of car and bike decorations and so on. Yet it took a countercultural festival environment in the late 1960s to remind us of the subversive potential of such display, when the flag was put to other profane uses—as when it was used as something to wear, even to mend things with.

The flag, by giving so many messages with so many voices simultaneously, is a common "material" rendering of the idea of the fabric of community. As such it makes an interesting contrast with another pieced-together object within our culture, the quilt. No object lives closer to the center of our nostalgia than the quilt. It maintains this imaginative hold for a number of reasons. It is made for family use, and passed down within the family. And we attach to it the ideal of the social situation in which it was presumably made—the quilting bee. This in-gathering was one of the ways in which rural people could get together to work in common purpose and to use that occasion for enjoyment and even celebration. More common, actually, were other gatherings—for barn raising, corn shucking, flax scutching (pp. 108-09) and hog killing. This last was an especially significant event, for it often came after the first frost and featured a distribution of the pig's parts to those attending. The pig symbolized the country economy, not only in the carrying out of the cooperative task and sharing of the meat, but in the practice of making use of everything of the animal but "the grunt and the squeal." But today it falls on the quilt to remind us most fully of these country ways.

In the minds both of those who make and use them, and of those who regard them simply as quaint relics

Dr. Abrahams, Kenan Professor of Anthropology and Humanities at Scripps and Pitzer Colleges in California, has done much research on festivals.

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Names given to quilt patterns often reflect American preoccupations, thus "Barn Raising."

The Uncle Sam Club of Buffalo used this costume at the 1936 Republican National Convention.

of our country past, quilts are attached to the passage of life and the seasons. They represent family and friends, reconstructions of a fragment of life pieced together by hand in the company of others. That most quilts are not, in fact, put together at bees matters little—for the ideal of the homogeneous, cooperative community is central to the way we feel about them.

If quilts are more often pieced and framed at home and in private, generally they still carry a public and ceremonial message that reads very much like the wedding vows and the baptismal service, a message of continuity. Such a familiar object is both useful and beautiful, belongs in the home but is also made "for show." In this capacity, they are entered into competition at county fairs and are widely collected.

In American popular culture, there is no more simple and elegant statement of our most nostalgic sentiments than the squared circle, the circled square. Such a figure we see rendered not only in the quilt, but in the square dance and, in a more topographical manner, in the town square. In this figure is reflected the simple ideal of an old-fashioned "country" way of organizing life, when people would spend their Saturdays in town shopping, talking, going round the square to see who else had made it to town.

Square dances and baseball

In a less static rendition, we find the same kind of clean and balanced figure in square dances. Just as the quilt has its repeated pattern, the square-dance figures actively circle the square. The set, four couples facing inward to each other, is put into motion by the caller, breaking the stability of the square, sending the males in one direction, the females in another, only to find them both arriving back *home* at the end of each figure.

A similar image is mounted for us in baseball. Here we have a kind of square within a square, the infield within the outfield. But the most important of these, the infield, poises its square on one of the points to make a diamond, the four corners strongly marked as bases. The objective, of course, is to circle the bases, again ideally ending up at *home*. The pace of the game remains more leisurely and the paraphernalia and practices more nostalgically backward-looking than in any other American sport. From such a perspective, all of the record-keeping and record-breaking are but ways of keeping the memory of past stars alive.

Although we do cling to many kinds of four-square, clean, backward-looking observances, we also have innumerable other ways of celebrating that look forward. In fact, our holidays have the two sides: the old practices which are commonly carried out in the home or some homelike location, and the emergent, the

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Detail of robe worn by the queens of Washington's Cherry Blossom Festival from the 1950s to '70s.

glittering, which are as often as not street affairs.

What embodies and brings out the holiday spirit more than a parade? Here the voluntary associations of the community celebrate their sense of coming together by developing a costume theme and building a moving form of display—just for fun usually. As opposed to the enclosing moves of say, the square dance, or even one of the ancestors of the parade, the procession, the parade is open-ended, beginning in one place and ending in another. Moreover, a place can be made for everyone in a parade, just as it can be in a street fair.

Parades easily have become advertisements for business, much as they did on the frontier when they were hastily organized to show off the new goods that had just arrived. The old idea of the pageant, then, is translated into a symbolization of the forward march of commerce and industry—just as fairs became World's Fairs and expositions. Festive intensification is rendered gigantically, with immense floats, marching bands amplified in size and sound, and skyscraping balloon representations of animals and comic characters as in Macy's Thanksgiving Day parade. But the old agricultural idea of making displays for the moment and out of highly perishable goods remains central to even these celebrations of technology.

The language of holidays and festivals maintains, then, a vocabulary of display in which the power of the most typical kinds of things may be condensed, then exploded or cut up and handed out. It is not simple chance that not only the parade but the lowly firecracker and the balloon, the wrapped present, the cornucopia, the piñata, the stuffed turkey and Santa's stuffed bag are powerful and pervasive images of our holiday celebrations. These embody both the essence of festival wholeness and the breaking, cutting or exploding which allows everyone to share the now-freed energies and resources.

The festive behaviors and seasonal celebrations of other peoples help us to recognize how our own festive occasions continue to draw on the same basic, even archaic, motives and means of having fun. For though we are predominantly a highly mobile city people, we have maintained innumerable occasions for celebrations out of our country past. Moreover, we have developed new forms of celebration, ones which reflect alternative ways of proclaiming and maintaining our relationships with others and with the world around us. But the older festivities, and the spirit of life-enhancement that has always been their source of inspiration, are of ever-greater importance to us.

Abelam people of Papua New Guinea decorate, carry large yams with masks like this in harvest festival.

"There had been an abundance of dogs and cats and raccoons and snakes, but none had been like Crowcrow."

By Rudolph Chelminski

Recollections of a childhood friend named Crowcrow

He sullied the books and furniture, cadged food from the table and stole everything in sight, but he helped two young boys learn about life

I was back in Connecticut for the first time in a couple of years, visiting with my mother in the house where I had grown up. As always happens in situations like that, everything was the same and yet utterly different: time had passed, and the imperceptible changes of day after day had become gulfs between me and the past, marker stones as stark and obdurate as my father's death, my mother's advanced age, my own entry into a profession, into fatherhood and what is commonly referred to as a responsible adult life.

The house in Wilton seemed darker than I had remembered it, shuttered and screened as if it had drawn in upon itself. It was also silent—amazingly, discon-certingly silent compared with the perpetual din that had dwelled there in the days when my three brothers and I had undertaken the destruction of virtually everything our parents possessed: the family silver (buried in the sandbox, strewn around the garden), the dining-room chairs (pummeled into creaking wrecks after a few years' resistance), the good china (which I don't even remember, my two elder brothers having got there first), even my mother's elegant old steamer trunk, which was emptied of its contents to become the first vessel to successfully navigate the Norwalk River from Turner's Bridge to Merwin's Falls.

The library corner of the living room had pretty well

Illustrations by Paul M. Breeden

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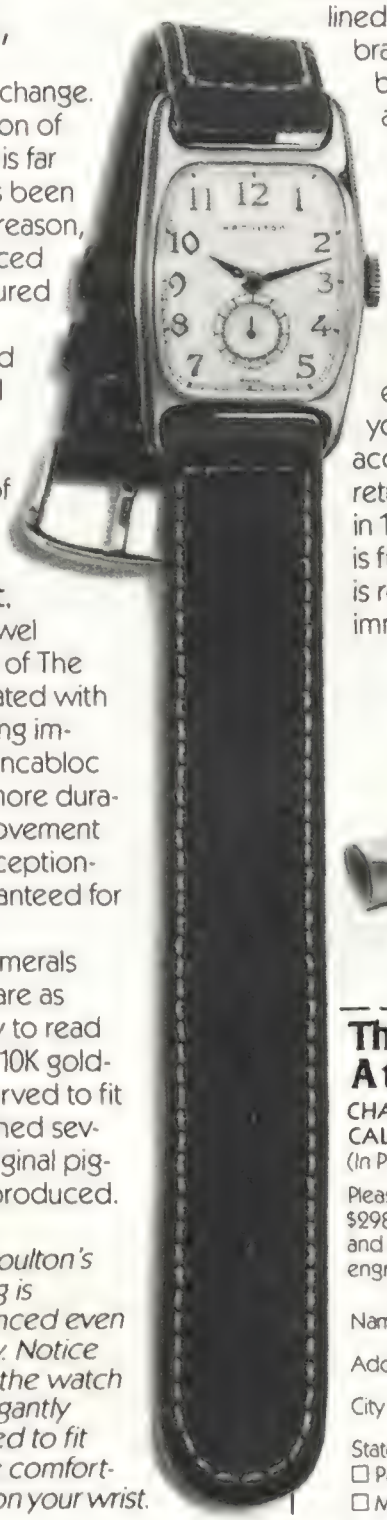

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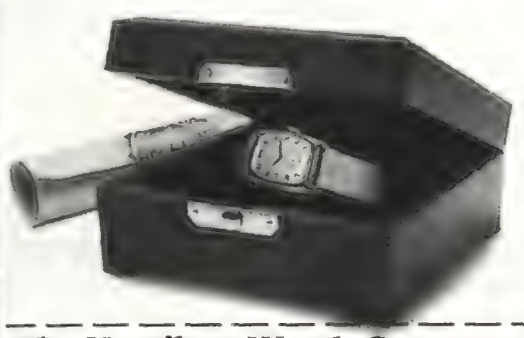

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"He would walk over to our plates, help himself with a quick strike of his beak."

survived, partly because of the sturdy oaken construction of the shelves, partly because of some inexplicable taboo that had held us back from demolishing books. For a reason which I have now forgotten, I wanted to look something up from within the brown row of encyclopedias which jutted out over the edge of the top shelf, up near the ceiling. As I absently drew the book down, my eye fell on something that I had seen before but had disappeared completely from my mind: a long, grayish stain running like a petrified rivulet down the cover. I glanced inquiringly toward my mother, and before I could form the question she already had the answer for me.

"Crowcrow," she said. "Don't you recognize his signature?"

Crowcrow! Suddenly I was flung back through the years as I stood there with an encyclopedia stained with an ancient bird dropping.

Dozens of pets and would-be pets

The author, who lives in Paris, wrote in April 1982 SMITHSONIAN *about the probable poisoning of Napoleon.*

A message from one of the nation's leading authorities on jobs...

AMERICAN WORKERS NEED HEALTHY ELECTRIC UTILITIES

By Robert A. Georgine

President, Building and Construction Trades Department, AFL-CIO

No one has a greater stake in the financial health of the nation's electric utility industry than Americans who work for a living.

There is scarcely a job today that is not somehow dependent upon electricity. More important, economic growth — the source of tomorrow's jobs — requires continued dependable supplies of electricity at reasonable cost.

Huge Investment Needed

Electric utilities must spend well over $300 billion in the remaining years of this decade if they are to convert from high-cost petroleum fuels, replace aging, inefficient plants and meet national demand growth.

I am told that a substantial portion of that enormous sum apparently will have to be provided by outside investors — individual savers and pools of money which often represent workers' pension and insurance programs. To attract that much and that kind of investment, utilities obviously must be able to compete with other potential investments.

This means care must be exercised to assure that the regulatory policies and practices of some states or agencies do not sap the financial strength of electric utilities.

Utilities must be financially strong in order to make the investment necessary to power the industrial revitalization the United States needs if we are to produce the jobs that are absolutely essential to bring about our immediate economic recovery and subsequent growth.

Industry Requires Power

Industry strongly considers the availability and dependability of electricity in its decisions to locate new or to expand existing plants. Communities which cannot assure reliable, abundant power over the long term, therefore, will lose jobs and tax revenues. Indeed, we are already seeing some signs of this on a regional basis.

We as a nation must compete with other countries for industrial development.

The lure of low-cost, dependable power abroad is a strong one, particularly for electricity-intensive industries with international markets. These industries are, for the most part, the basic ones that provide vast employment opportunities and are tremendously important to our national security.

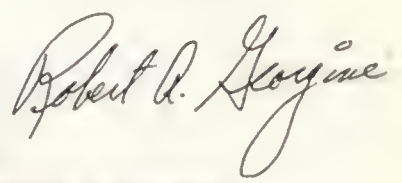
National Security Threat

Nor should our national security be threatened by a dependence on energy supplied principally by a foreign country or group of countries.

In addition, high-growth industries, such as electronic data processing and information services, rely on constant, reliable supplies of electricity.

Neither the industries nor the individuals of our nation can long sustain the dislocation brought about by brownouts, blackouts or power rationing that would result from insufficient or unreliable generating capacity.

There is a direct relationship among sufficient power, meaningful employment and job opportunities, as well as between developing our own sources of energy and assuring our independence.



Robert A. Georgine

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had shared our existence in the Connecticut countryside in those days during and on either side of the Second World War. There had been an abundance of dogs and cats, of course, and hamsters and budgerigars and raccoons and snakes and frogs and even one attempt with a skunk. But none had ever been like Crowcrow.

It was my brother Vicky, two years older but infinitely wiser and more adept in matters of true interest to boys, who brought him home to our astonished delight one spring day in what must have been 1945 or '46. He was a baby, still unable to fly properly, although he gave it a good try whenever he could. Vicky had found him in the woods, grounded and unhappy after what apparently had been a premature solo from the nest. Without any idea of how to go about it, we decided to adopt him and make him our companion.

At the start, we fed him almost exclusively on worms—what else would little boys think of giving to a baby crow? He was insatiable but healthy, and our improvised diet seemed to agree with him because he rapidly changed from an imploringly chirping juvenile to a strutting, self-assured omnivore who would walk over to our lunch plates—crows *walk*, they don't hop and bounce the way silly little decorative birds do—cock his head into that funny, sideways stare and help himself to whatever pleased him: a swift strike of the beak —*bonk*!—a few jerks of the head—*ulp ulp ulp*—to get it down, and then on to the next plate for inspection. There aren't many children around who have enjoyed the privilege of having a pet crow, I think, because there are even fewer mothers who would have allowed one into their houses, and keeping a wild bird is illegal these days.

Our mother was especially wonderful in this respect, and for the best part of two decades our little white house with the big red barn next to it

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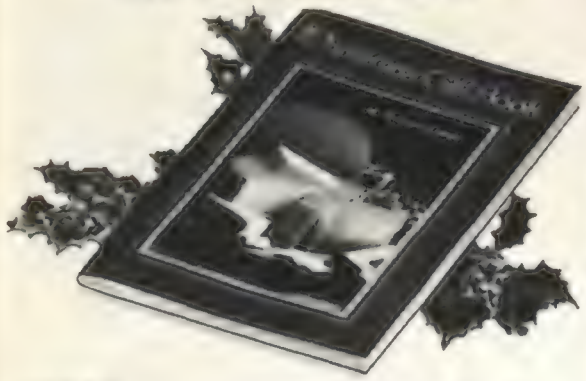

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"Saying good morning, he spread his wings until they touched the windowsill."

functioned as a kind of unofficial club for about half the town's population of boys, drawn by instinctive magnetism to the wild and irresistible and generally forbidden things going on around there. Things like crows in the dining room, snakes in the bedrooms, flour bombs dropping with precise timing on passing cars, firecrackers in the neighbors' mailboxes. Canny as a weasel, our mother developed an absolutely unbeatable Sarah Bernhardt act which she played on cue every time a state trooper came to investigate complaints, culminating in a crescendo of tears which inevitably sent him scuttling away in mortification. State troopers are no good at dealing with women's tears.

With Crowcrow, her tolerance for boys and animals reached new levels. Although his domain was the outdoors, from the start he had arrogated to himself visiting rights to the inside of the house. Having a crow marching around your house obviously means accepting sullied furniture and encyclopedias, but that is not the end of the story; there is also the matter of their bartering instinct. Crows, like pack rats, are born with an unaccountable passion for shiny, glittery

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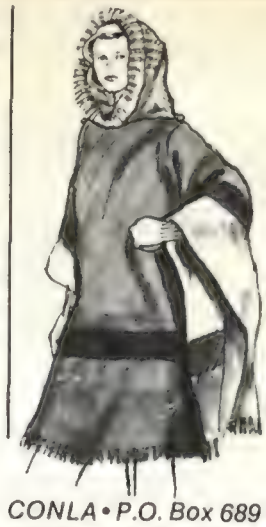

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objects, and are driven by the imperious necessity of claiming them. Crowcrow's shoplifting around the house soon took on epidemic proportions, and naturally he spent most of his business hours among the dressers and tables where our mother had strewn her jewelry. Before she learned to shut doors and drawers, she was dispossessed of most of what had remained from our own childish depredations of a few years earlier. But Crowcrow was a gent: whenever he stole something, he always left something in its place. A deal's a deal. Our mother had to take what meager consolation she could muster from the exchange of, say, a broken clothespin against a gold earring. For years afterward, in odd little corners of the house, we would discover Crowcrow's treasure caches, and little by little Ma reconstituted her jewelry supply.

Having been taken so young, I suppose Crowcrow mistook us for his parents, and our family his flock, because he stayed with us every bit as faithfully and affectionately as a dog. His "doghouse" was a big forsythia bush whose branches reached up to the second-floor windows of the bedroom which Vicky and I shared. On mornings after chilly nights, when we had closed the windows, he would awaken us by rapping on the pane with his beak. Only after we had opened the window would he say hello.

A crow's morning greeting is something that has to be experienced to be believed. I don't know whether it corresponds to some timeless ritual of the species, but it was always the same, and it was so strikingly, so emphatically a demonstration of pleasure at seeing us, that today, still, decades later, I smile inwardly when I think of it. I see him again, standing on the windowsill, the blue-black of his feathers glistening in the soft morning light, beginning to bow. With slow dignity he lowered his head, and the bluish eyelids came down over his bright little eyes. At the same time he

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spread his wings out and down, fan-like, until the long feathers touched the windowsill. When he was fully into his *révérence* he cooed in a gentle burble that was more like dove than crow. Two or three coos like this, raising and lowering the head with each one, and then it was time to get down to business again: inspection of the room, shoplifting, grabbing bits of food, disciplining us with a sharp blow of his beak if we got in his way.

But it was when we were outside that Crowcrow became the best imaginable companion for a ten-year-old boy. Vicky and I were constantly in the fields and the woods in those days before television and housing developments, when cars were still scarce on Ridgefield Road, and when boys would spend whole days tramping miles and miles, lost in their own world of half fantasy, half reality. Crowcrow came with us, of course, and he, too, lived in the interstice of two worlds, the bird one and our own.

Vicky and I would watch with admiration as he effortlessly swooped away to the end of the field, higher than the highest elms, and circled the places where other crows were flying. They tolerated him—there were never

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any movements of attack—but it was clear that he didn't belong, and he always returned to us, landing with a thrash of wings and a thump on our shoulders for a little rest. Sometimes he chose to land on our heads, where the grip was somewhat more precarious but the view better. Then Vicky and I would wait with laughing foreboding for the little liquid squish that would announce his signature dropping into our blond hair.

The camaraderie we felt for Crowcrow naturally enough spilled over to the whole species, and Vicky and I began to read about crows and other commonly scorned animals in the wonderful books of Ernest Thompson Seton. We concluded, with Seton, that they were the most intelligent and estimable of birds, and that their sense of organization was close to miraculous. Like soldiers in a hostile world—which was quite true, because the Yankee farmers among whom we lived and through whose fields we wandered unanimously despised them, and happily killed them when they could—they nested in great numbers in the densest and most remote sections of the woods, surrounding their "encampments" with concentric circles of sentry birds whose task was to give the alert at the approach of any potential enemy. As human beings, even small ones and accompanied by our crow, we were enemies.

Vicky and I listened with rapt attention to the sentries' cries echoing from rampart to rampart over the towering tops of hickory, elm and maple, and noticed, as Seton had told us we would, that the call was different if it was one boy alone, or two or more together. Seton had even noted a difference between the call for "man alone" and "man alone with a gun." But we never carried guns along when we went crowing.

Fired with evangelism as we were, Vicky and I tried to persuade the farmers and gardeners that they were wrong to hate crows, and that the

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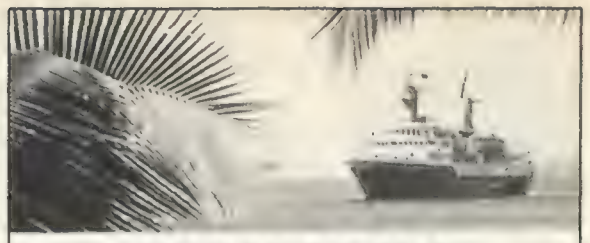

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tiny portions of seedlings and crops which they ate were more than compensated for by the innumerable rapacious insects that they devoured before *they* could get to the crops and do far greater damage. But adults don't take well to lessons from boys; they laughed and cursed and went on shooting crows. What offended us the most were the cruel and macabre scarecrows—even that word was obnoxious—which they favored: a brace of dead crows tied to a pole stuck in the garden.

If Crowcrow received any message whatsoever from the sight of these hideous trophies, it was not one that Vicky or I could perceive. As the summer drew on he grew bolder, more self-assured and completely integrated into the family. Now that the novelty of his presence was gone, he was simply one of us. Call it anthropocentrism if you like, but I'll swear, today still, that he had a sense of humor; there is nothing in the world that animals and children adore more than a good joke. Vicky and I were convinced that his endless exchanges of glittery objects were in large part motivated by a kind of ornithological tomfoolery, but it was with Freddie Boyd that he carried his humor to an act of pure genius.

Freddie Boyd was a neighbor, scion of an old Yankee family, and he was gifted with the Yankee's traditional sharp wit, caustic tongue and gruff manner. He rather intimidated us because he knew the woods and its fauna as well as we did and because he was always a step or two ahead of us in repartee. Many were the times our ears had grown red under the assault of his nimble sarcasms as we struggled with awkward, puerile retorts. It was at a moment such as that, on an early September afternoon out behind Freddie's house, in the presence of our parents (which made it all the better), that Crowcrow came to our rescue with a magnificent gesture which I shall never forget.

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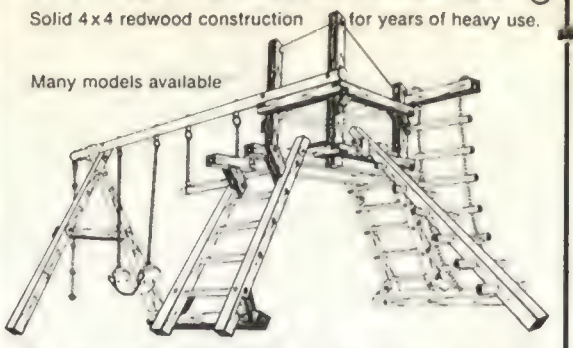

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From the branch of an oak tree 30 or 40 yards away, he spotted Freddie's spectacles.

Wire-rimmed spectacles they were, glittering with tantalizing silver flashes in the warm autumn sunlight. *Hmmm. . . .* Crowcrow cocked his head sideways, rubbed his beak a couple of times on the branch in that characteristic knife-sharpening gesture, bobbed once, then swooped swiftly down and gracefully plucked the spectacles from Freddie's head without so much as a by your leave. The attack was silent, audacious and a complete success. Freddie lost all his Yankee composure, shouted and cursed and flailed his arms and even briefly ran as if to overtake the bird before realizing the futility of the exercise. He stopped after a few paces and stared, molelike, as Crowcrow disappeared over the horizon of trees. Vicky and I rolled on the ground, shaking with laughter and triumph.

Toward the end of September, as the days grew shorter and the air sharper, we began to see somewhat less of Crowcrow. For one thing, we were gone for most of the day in school and, for another, he had taken to long, solitary flights around the house and beyond: down by the river, up over the crest of the ridge toward Drum Hill, past the Schlichtings' house toward the cemetery, where gravestones reached back to the 18th century. Had we done wrong in taking him in? The thought occurred to me as I watched him circling cautiously around the periphery of a flock of truly wild crows. Was he unhappy? Did that word even have any meaning for crows? Who knows. What counted is that he always came back to us.

It often happened that the two of us decided to walk the mile or so to school instead of taking the bus, and of course Crowcrow came along. Down over Turner's Bridge, across lots to the stone bridge, past the burned-down tree and the old foundation, through the natural gardens and

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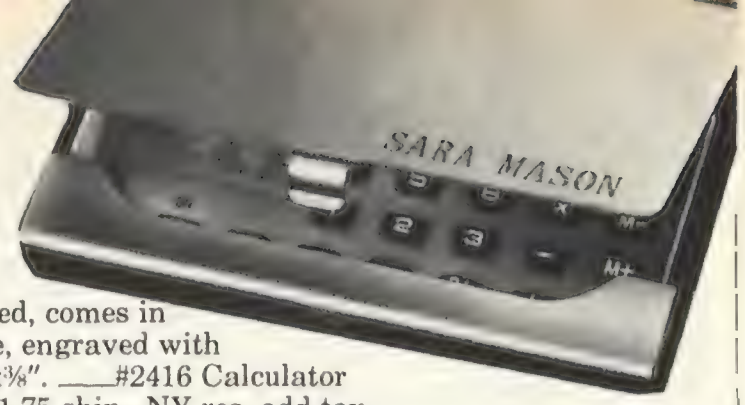

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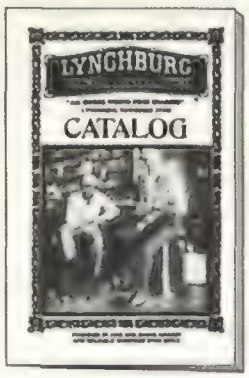

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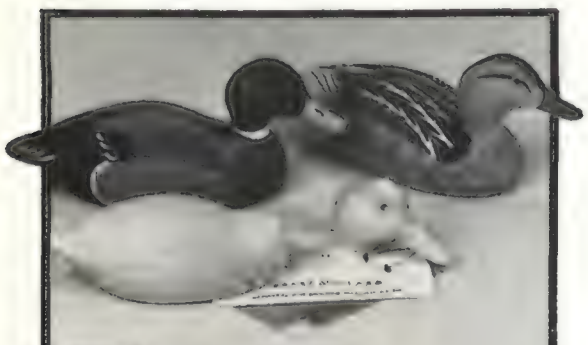

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the old cow fields to Merwin's farm, up the embankment and across Ridgefield Road to Wilton Center, we would watch him gliding and playing and inspecting, envying the ease of his flight and mentally projecting ourselves up to those great heights where he sat peering down at us.

During classes he waited for us on the roof of the school, and at recess he came down to greet us, and my brother and I gained great standing among our schoolfellows. We even cawed up to him, giving the impression that we knew how to talk to crows. This was scarcely true, but it wasn't only for show. By then we did, indeed, feel a brotherhood for all crows, and for years afterward Vicky and I and the few other friends who shared our feelings would caw as we walked, our manner of saying hello to the crow kingdom.

It was pleasant to walk to school with Crowcrow, but our more usual route was via the big orange school bus, Number 5, driven by old John Disbrow, who doubled as fire chief. With his powerful wings and piercing gaze, Crowcrow could have easily followed us, but he seemed to have an aversion for such soulless automotive monsters and he stayed home with our mother on those days. One afternoon we returned from school on the bus to learn something that we should have realized all along: autumn was also the opening of hunting season.

"Crowcrow's dead," our mother told us. "A hunter shot him."

Poor Crowcrow. He never had a chance. He had never learned to beware of human beings. He had just sat there on a branch at the edge of our property as the hunter approached. Had the man wondered why the crow didn't fly as he raised his gun? We buried him out behind the pines.

Vicky and I couldn't accept his death. It happened in the real world of men and firearms and killing seasons and the tugs of ancient atavisms, but we couldn't accept it as something

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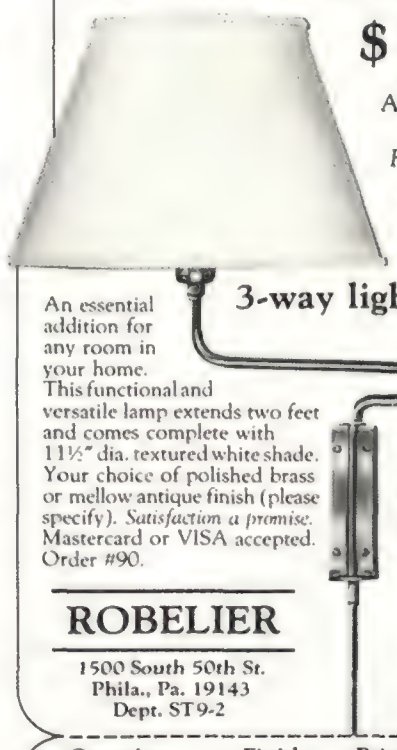

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"He climbed up and got another crow; it was as if the first had never gone away."

that had to have happened in our world. It was an accident, an aberration. The following spring Vicky climbed up to a nest and got another baby crow.

We called it Crowcrow, and it followed exactly the same development as the first one. It was as if the first one had never gone away. As the months passed, the two birds melded into the same animal and our brotherhood with crows grew even stronger. Our pain was soothed. Our world was the real one again.

Withal, we were not foolish enough to forget about the killing. On the contrary, we took it as a personal challenge not to allow it to happen again. That autumn, we bought (or made our parents buy) several dozen posters, white with thick black lettering:

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had indeed seen the signs. He told us so himself. But it never entered his head that the game preserve could have been intended for crows. Crows weren't anything worth preserving. They were vermin. They were supposed to be killed. He was sorry about that, but look at it his way.

Vicky and I didn't try to get any more crows after that. I suppose we owe that hunter a grudging vote of thanks, because he helped us start growing up. Once and for all, he had dispelled our illusions about which world was the real one. If I had to date the loss of my innocence, I would say it started with the death of our second Crowcrow.

Vicky and I began growing up—or we got older, at any rate. Our collusion with nature and animals receded as we took on interests and activities more in consonance with the real world. Vicky turned more and more to machines and I to books, and both of us eventually made careers reflecting those choices. It was perfectly logical, come to think of it, that I should be holding a book as I stood there in the living room with my mother as the floodgates of memory suddenly burst open to bring me back to Crowcrow.

Later that morning I took a walk down past the brook, past the sycamore where we all carved our initials (still there) and into the hummock-shaped field which had been our vast childhood playground. The field had a plywood colonial house on it now, and since I couldn't very well march across these people's front lawn, I skirted the property in the undergrowth by the old stone wall and angled off toward Bates' farm. That was gone, too, and there were more houses where the corn had grown and the cows had grazed. I walked awkwardly in my city shoes, mushing through tufts of buffalo grass engorged with autumn rains. Everything had changed.

Everything but one: the crows. They were always in the distance, which is natural and wise where human beings are concerned, but they were everywhere, soaring over the treetops and rooftops and calling out to one another and going about their business. Their insistent caw-caws rang shrilly through the thin November air, and I impulsively tried to caw back the way Vicky and I used to do, but my voice had changed and all that emerged was a choked shout.

You can't do that anymore, I thought. You can't do a lot of things anymore when you've definitely left your childhood behind. I felt a poignant stabbing in my heart as I watched the graceful black shadows wheel in the sky, but it was quickly followed by a comforting thought: they would win. Long after my mother and I would be gone, long after the plywood houses had turned to dust, long after mankind's tortured history had unfolded its last mystery—there would always be crows, I was sure. Clever, adaptable, endurable, *innocent* crows. They would survive. Somehow, that was a consolation.

"Poor Crowcrow. He never had a chance. He had never learned to beware of human beings. We buried him out behind the pines."

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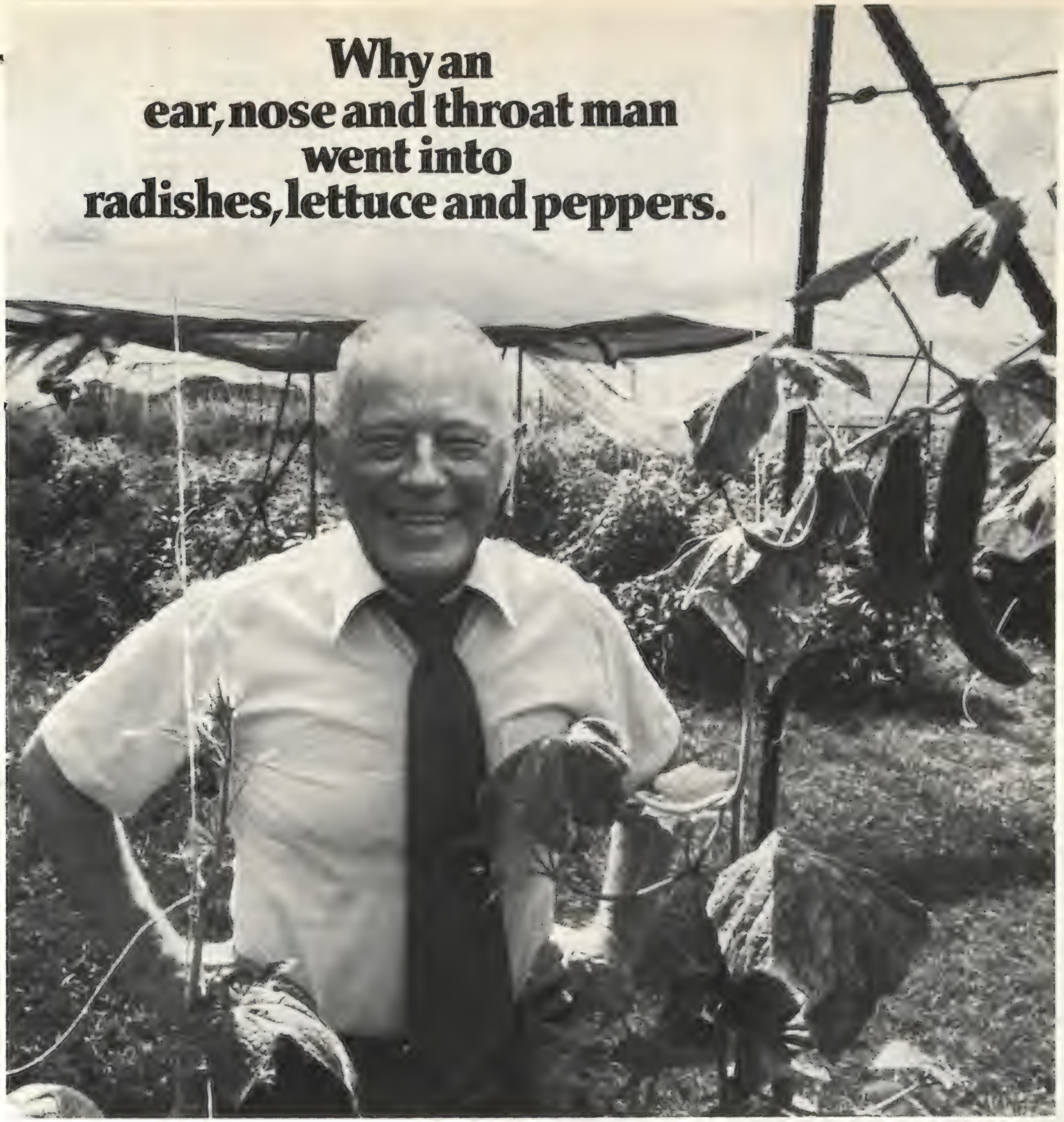

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Book Reviews

Antiquitates Culinariae
The Reverend Richard Warner
Prospect Books, $75

Thanks to Prospect Books, a small, scholarly publishing house which specializes in cookery-related subjects, *Antiquitates Culinariae* by the Reverend Richard Warner has been made popularly available for the first time since it was published in 1791.

The main body of the work is made up of *The Forme of Cury* (cookery), the first important English cooking manuscript, consisting of 196 recipes taken from a vellum roll written around 1390 by the master cook or cooks of King Richard II.

In addition, there are three sections of other antiquarian recipes, including one on preserving fruits which would apply as well today as it did in 1631 when it was written. These are followed by two culinary accounts of the enthronements of George Neville as Archbishop of York and Chancellor of England in 1467 and of William Warham as Archbishop of Canterbury in 1504.

The prodigality of these feasts is matched by other ceremonial meals which Warner describes with an exquisite combination of relish, disapproval and scholarship in his "Preliminary Discourse" and "Additional Notes and Observations."

In tracing the history of cooking from Genesis to his own time, Warner, whose interests lay in early English cookery, describes the time when "earth, air and ocean [were] ransacked, to furnish the complicated delicacies of a Roman supper," adding with distaste that "the animals . . . which the Roman epicure

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devoured, would now be eaten only in a time of famine; for surely it would be esteemed preferable, to suffer something from hunger, than to load the stomach with *dormice, polypi, hedge-hogs,* and *cuttle-fish.*"

He goes on to deplore as well the Druids' propensity for eating their human sacrifices, along with the generally dulling effects on the table and civilization as a whole of the Saxon conquest.

During the Middle Ages, lavishness of table became a critical indicator of station and power in England, both among the nobles and the religious. At one ceremonial feast 6,000 guests were served 3,000 dishes. In the 13th century at the celebration of the marriage of Richard, brother of Henry III, to the daughter of the Count of Provence, the menu consisted of 30,000 dishes.

When it came to extravagance, none outdid Richard II, whose household employed 2,000 cooks and 300 servitors to attend to the gastronomic needs of 10,000 visitors who daily "went satisfied from his table" and for which "twenty-eight oxen, three hundred sheep, an incredible number of fowls, and all kinds of game were slaughtered every morning." Before such abundance Warner stands in awe, noting that "when we read the accounts of the first years of Richard, we cannot help fancying ourselves transported into the fabled regions of romance, or the inchanted land of fairy revelry."

Antiquitates Culinariae is a stunning facsimile of the 1791 edition. Accompanying almost 200 pages of text handsomely printed in the same large format as the original are two unusual illustrations from an earlier edition: a Saxon entertainment and the rare peacock feast. For reasons of copyright, they were removed from most volumes of the 1791 printing.

The recipes themselves are fascinating for what they tell about eating habits, available ingredients and spicing. One, which is devoted to preserving the glory of the plumage of the peacocks that adorned English tables until the beginning of the 17th century, demonstrates the importance of presentation.

The Reverend Richard Warner, who felt the comparative simplicity of the 18th-century palate to be desirable, was not overly impressed by the elaborateness of the food served in the Middle Ages. Noting that French cooks were in fashion even in the time of Richard II, "they ap-

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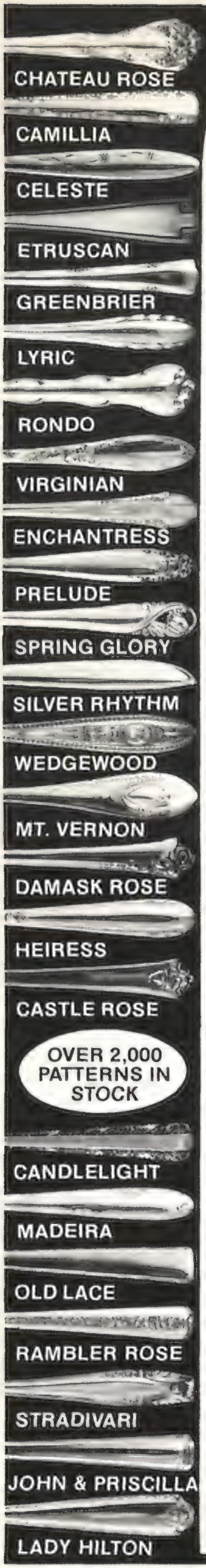

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pear to have equalled their descendants of the present day, in the variety of their condiments, and their faculty of disguising nature, and metamorphosing simple food into complex and non-descript gallimaufries [hodgepodges]."

Nor does he think much of the recipes in the *Forme of Cury*: "The combination of such a variety of different articles in the formation of one dish, would produce an effect very unpleasant to a palate of this day; and the quantity of hot spices, that were mixed in almost all of them, would now be relished only by those accustomed to the high-seasoned dishes of the East and West-Indies."

It is, of course, a matter of taste.

Judith Huxley
Food and cooking columnist

Lulu in Hollywood
Louise Brooks
Alfred A. Knopf, $15

Yet another movieland memoir, you ask? Another bygone love goddess Telling It All in hopes of a few dollars, a few ticks of borrowed time in the spotlight? No, this one is different, if only because Louise Brooks not only tells it all but writes it all herself. Movie stars who can do their own laundry lists are rare enough; here is writing of genuine quality—shapely, urgent, unforgettable. Like Louise Brooks

Seductive siren Brooks drinks champagne in the 1929 classic, *Diary of a Lost Girl.*

Serious student of dance at 15, Louise Brooks was too independent for teacher.

herself, in other words, in that harrowingly brief time when her special glory blazed across the silent screens of America and Europe.

New Yorker magazine's William Shawn, of all people, has written a two-page introduction to this collection: an unabashed love note from this proverbially aloof, sequestered, mystery man of an editor. It was the *New Yorker* which, in a 1979 profile by the late Kenneth Tynan, brought the astonishing word that Miss Brooks, 40 years after the dreary fizzle of her strange and haunting film career, was alive, physically infirm but at least mentally and spiritually well, in a dowdy apartment in Rochester, New York.

Like any film buff worthy of the name, Tynan knew Louise Brooks foremost as the alluring Lulu of G. W. Pabst's *Pandora's Box* (a 1929 film version, starring the then 22-year-old actress, of the Frank Wedekind play that Alban Berg used in his opera *Lulu*). Braver than most buffs, Tynan was inspired, after seeing a television rerun of the film, to track down Miss Brooks herself. She received him reluctantly. "I've been killing myself off for 20 years," she told him, "and you're going to bring me back to life."

Tynan's memoir, one of his last pieces before his early death, is in his *Show*

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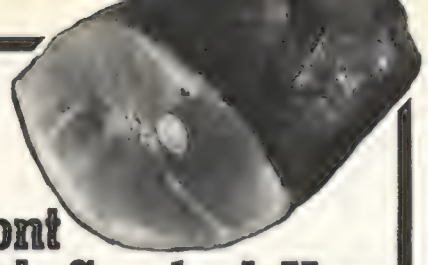

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People (Simon and Schuster, 1979). While the delights of Louise Brooks' own book can certainly be savored head-on, Tynan's rapturous piece provides a valuable context. Aside from an occasional run of *Pandora's Box* at a revival house or on PBS, virtually none of her work is currently visible; of her two-dozen films, most of them Grade-B or worse, several have completely disappeared. Tynan got to see what films he could, and he evaluates the subtle magic that enabled this diminutive, utterly natural child of the Kansas plains to bring Lulu to life out of the shadows of a Hollywood nothingness like *A Girl in Every Port*.

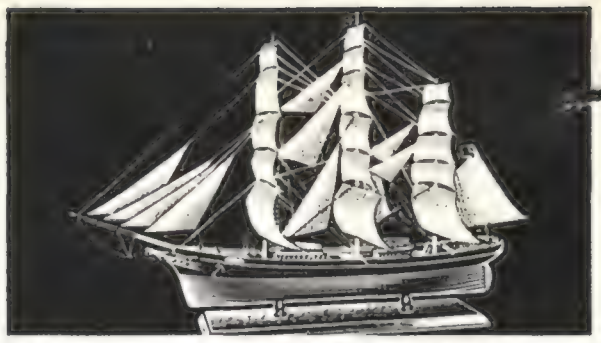
What captivates us about the author is her utter guilelessness as she details the outrageously shrewd orchestration of her own rise from showgirl to star. Her supporting cast is star-studded with such luminaries as William Randolph Hearst and his mistress, the lamentably talentless Marion Davies (with a poignant cameo appearance by the real Mrs. Hearst); the beautiful young Humphrey Bogart in search of his own dramatic soul; the love-starved, tormented genius of W. C. Fields; and the brilliant, defeated Lillian Gish. Louise Brooks' last film, in 1938, was a John Wayne oater for Republic. She was 31. Still in charge of the orchestration of her career, even as it lay shredded, she at least had the sense to get out in time. She worked for a time as a shopgirl in New York, had her bills paid by a few generous gentlemen, and wrote. Most of *Lulu in Hollywood* consists of short memoir pieces written over the years for various film journals. Chapter One, however, is new: Kansas girlhood to Broadway chorine, a replay of *Gentlemen Prefer Blondes* but with "the laffs" gone sour.

The book is short, but along with its 108 pages of grace and wisdom there are the photographs—stills, publicity shots, snapshots—in testimony to a beauty that flashed too briefly across the screen. Those eyes! Those words!

Alan Rich
Music critic, *California* magazine

A History of Venice
John Julius Norwich
Alfred A. Knopf, $22.95

In the opening pages of his *History of Venice*, John Julius Norwich confesses his great affection for the city of the lagoons. He fell in love with it at 16 when his



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father, wisely shunning museums and dry guidebooks, led him wandering about the serpentine alleys and canals. His sensual experience of Venice—the spectacle of marbled palaces, the play of light and shadow, the smell and sound of water—provided an enduring context for the later historian. Henry James, who also loved the city, warned that it could overpower the writer: "We profit by that enormously, but to do so we must either be quite off duty or be on it in her service alone."

Happily for the reader, Lord Norwich is wholly engaged by Venice, and his book places extensive scholarship at the service of his long-standing affection. In addition, both research and appreciation were at work in the selection of the 59 excellent illustrations, ranging from one of the earliest surviving maps of Venice to a fanciful view of life in an 18th-century torture chamber.

Lord Norwich elegantly tells the story of Venice from its obscure origins amid mud and marsh in the fifth century A.D. to its final extinction as an independent city-state by Napoleon in 1797. It was a remarkable history, encompassing more than one thousand years of achievement in art, commerce and politics. Naturally, the art is most widely known, for the paintings of Titian, Tintoretto and Tiepolo grace the world's museums, while the music of Vivaldi, Monteverdi and Albinoni is still being recorded. But the greatest Venetian work of art is Venice itself, a city almost miraculously preserved in its medieval aspect. Looking at Venetian architecture, Lord Norwich sees an array of centuries, moments frozen in time. The Basilica of San Marco, the central church of Venice, was an 11th-century creation, set off with a marble facade and gilded bronze horses in the 13th (see p. 100, this issue), crowned with Gothic pinnacles and crockets in the 15th, and defaced with mediocre mosaics in the 17th and 18th.

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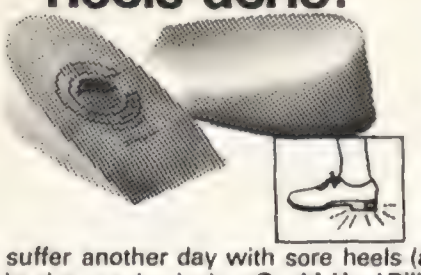

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Winged Lion of San Marco and Doge Foscari adorn gateway at Doges' Palace in Venice.

the state. The government also supervised the Arsenal, a shipbuilding complex whose size and efficiency dazzled Dante, inspiring him to evoke its fiery pitch in the *Inferno.*

The bulk of Lord Norwich's book is a vivid and immensely detailed political narrative. He manages to mention every one of the 118 doges who presided over the Venetian Republic from 726 to 1797, and while he is forced to admit that they "appear a fairly dim lot when viewed in the mass," he does burnish most of them individually with telling anecdotes and a graceful style. He never loses himself in pedantic detail, and he realizes that Venice's political achievement was formidable and demands examination. If one dates the emergence of a full-fledged republic in Venice from as late as 1300, then Venice is easily history's most long-lived republic. The United States is now the world's oldest existing republic, but it must endure another 300 years to match Venice's longevity.

Lord Norwich opens the final section of his book ("Decline and Fall") by quoting Wordsworth's famous ode on the fall of the Venetian Republic: "Yet shall some tribute of regret be paid/ When her long life hath reached its final day. . . ." His "tribute of regret," informed by affection

and learning, is this celebratory history of the city that remains the most beautiful in the world.

Robert Finlay
Visiting assistant professor of history
University of Illinois

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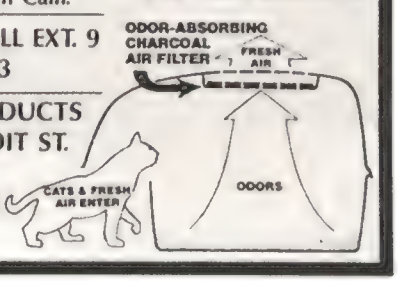

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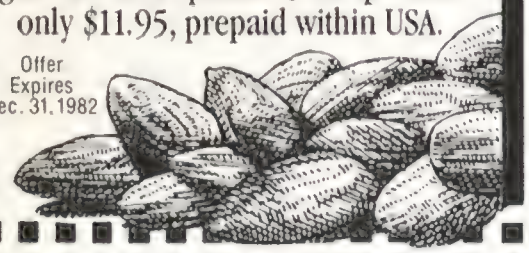

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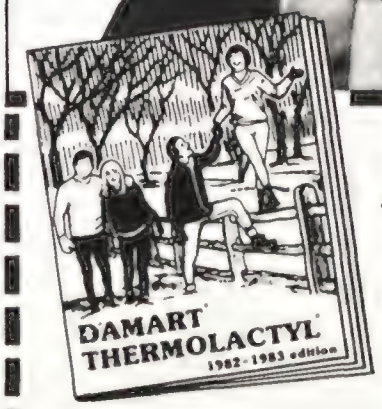

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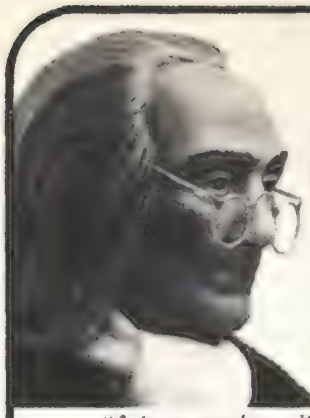

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Smithsonian highlights

A landmark exhibition is this month's opening at the Air and Space Museum, "Black Wings: The American Black in Aviation." More than a year's detective work by curators Von Hardesty and Dom Pisano yielded a collection of photographs and memorabilia documenting black pioneers in aviation. Included are individuals such as Cornelius R. Coffey and General Benjamin O. Davis jr., as well as the men of the 99th Pursuit Squadron—the first all-black unit. Some of the pictures had been pasted in souvenir scrapbooks or stored in cartons for decades. "Blacks in aviation was a forgotten history," says Hardesty, "but once we started going into it, we hit paydirt."

A bit off the Mall's beaten track is Smithsonian's Barney Studio House, 2306 Massachusetts Avenue, N.W., where a special collection of paintings, textiles, silver and photographs will be exhibited September 30-May 31. The collection, not normally on display, illustrates Alice Pike Barney's influence on the cultural life of Washington in the early 1900s.

Special September exhibits and events

National Air and Space Museum

Black Wings: The American Black in Aviation (September 23-July 1984) Recently collected memorabilia (see above).

Frisbee Disc Festival (September 5, noon-5 P.M.) Fly your Frisbees on the Mall; rain date, September 6.

Raid at Ploesti (September 17, 7:30 P.M.) Lecture by Commander Norman Appold.

Probe (opens September 29) Spacearium's 30-minute planetary odyssey.

Famous Telescopes (September 4, 9 A.M.) Monthly sky lecture.

Battle of Britain (September 24, 7:30 P.M.).

Renwick Gallery

Celebration: A World of Art and Ritual (through February 21) Religious, political and agricultural objects (see p. 108).

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Black aviators at NASM: Willie Fuller of the 99th Squadron in Sicily, 1943

National Museum of American Art
In Pursuit of . . . (September 3-October 31) The Washington Print Club's ninth biennial members' exhibition of 61 prints.
William H. Johnson: The Scandinavian Years (September 17-October 31) Works influenced by a black American artist's stay in a Danish village in 1930.
Joseph Goldyne: Monoprints and Monotypes (September 24-December 5) In-depth survey of the intimate and witty works of a San Francisco artist.

National Portrait Gallery
Civil War Prints (September 10-April 3) News and propaganda from the North and South; heroes, martyrs, villains.

Hirshhorn Museum & Sculpture Garden
Raphael Soyer: 65 Years of Printmaking (through October 3) Etchings, lithographs and drypoints.
Soyer since 1960 (through October 3) Exhibit of 17 major paintings.

Cooper-Hewitt Museum (New York)
Scandinavian Modern, 1880-1980 (September 14-January 2) Retrospective includes furniture, ceramics, textiles, glass.
Lace (through November 7) Caps, ornaments, trimmings, 16th to 20th centuries.

Radio Smithsonian
Whales, El Greco and voodoo are just a few of the September listings for Radio Smithsonian. To find out which stations in your area carry these programs, write: Smithsonian Office of Telecommunications, MNH Room C222B, Washington, D.C. 20560.

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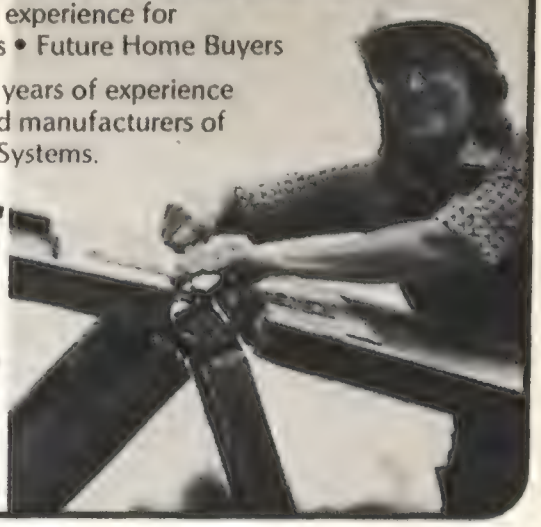

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What I overlooked was the English idea of central heating. After I left London the weather suddenly turned shivering cold and wet. By the time I got to Denton Hall I was too tired and miserable to care about picturesque charm and history. All I could think of was how uncomfortable I was going to be in an old, drafty castle.

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When I got back to the United States I soon learned that the flannel sheets in stores didn't feel or look the same at all. The polyester in them made such a difference.

Finally, I got so frustrated I went to Damart, a company in my home town, and suggested they sell real English flannel sheets and pillowcases. They loved the idea.

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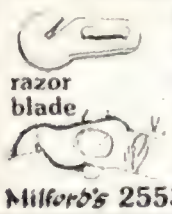

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Smithsonian events

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Audubon Lecture Series (Mondays, 6 P.M. or 8:30 P.M.) Ten lectures throughout the year on exotic species and fundamental issues in the natural sciences.
Soviet Films (Thursdays, beginning September 16) Six contemporary films.
Ancient Rome: An Archaeological Perspective (September 25) All-day seminar.
Art Nouveau: The Exquisite Epidemic (September 15, 6 P.M.) Lecture.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian, Washington, D.C. 20560. Here are some September exhibits:
Tucson (September 4-October 3) *German Textile Art,* Museum of Art.
Little Rock (September 4-October 3) *Contemporary Czechoslovakian Printmakers,* University of Arkansas.
San Mateo, California (September 4-October 3) *Transformed Houses,* West Coast Federal Savings.
Tampa (September 11-November 28) *America's Space Truck: The Space Shuttle,* Museum of Science and Industry.
Flint, Michigan (September 11-October 10) *America's Architectural Heritage,* Alfred P. Sloane Museum.
Auburn, New York (September 11-October 10) *America's Architectural Heritage,* Schweinfurth Art Center.
Raleigh, North Carolina (September 18-October 17) *Aquaculture,* State Museum of Natural History.
Austin (September 4-November 21) *Urban Open Spaces,* Pasillo des Artes Gallery.
Corpus Christi (September 4-October 3) *The Contemporary American Potter,* Weil Gallery, Center for the Arts.
Boston (September 4-January 1) *Crafts of Saudi Arabia,* Science Museum.

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Begin your Smithsonian visit at the Associates Reception Center in the castle, and receive special printed materials and full details on benefits—discounts in Smithsonian shops, dining in The Court, relaxing in the Lounge and a slide-lecture on 13 Smithsonian museums. Most museums are open 10 A.M.-5:30 P.M. NASM, open for the summer until 9 P.M., resumes closing at 5:30 P.M. on September 7.

For a free previsit information packet, send postcard request to Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560, or phone 202-357-2700; for hearing impaired, TDD 202-357-1729. Allow two weeks for receipt.

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Funny faces in funny places

For the photographer with patience and a sharp eye, nature's surprises are always ready to be snapped up

Sometimes Kjell Sandved sits chest-deep in a lily pond peering through his camera lens until some insect fills the frame. Then he snaps. Or, stalking other quarry, he treads a forest path, patiently studying flowers, caterpillars or the remains of a chewed-up leaf. To test himself, he often turns back to swish the underbrush with a loose branch. "The number of insects that fly out is amazing," he says. "Of course, it's their job to hide and my job to find them."

What Sandved often sees are faces (right). "Nature is my Rorschach test," says the renowned nature photographer and film maker at the Museum of Natural History. "Once I discovered hidden faces, they seemed to be everywhere. I'd see a twig [near right, bottom] and suddenly I'd see its upstretched arms."

Anyone can take good nature photographs, says Sandved, who often lectures on the subject. Top priorities are the ability to follow the simple rules of photography, patience and a camera. And not even a sophisticated one at that. You do need a close-up lens—or you can reverse a normal lens with an adapter. "Even a slice of mailing tube taped to your lens will work," he says. "That's what I used in the early days."

Sandved's suggestions tumble out with enthusiasm: photograph flowers before the sun hits them and dries the dewdrops; use a mirror to reflect light on a subject in the shade; use a fast shutter speed with artificial light, or a tripod, to avoid vibration; aim for moths and butterflies in the early morning when they're still sluggish. Although Sandved travels in his work, he emphasizes that an observant photographer can see nature's wonders everywhere. He is fond of quoting the scientist Louis Agassiz, who once said: "I spent the summer traveling. I got halfway across my backyard."

Carol Simons

A simple bud on the European ash tree shows off like nature's spring doll.

Nymphalid butterfly may escape if attacking bird aims for "face" on wing.

Caterpillar ate part of a leaf, leaving surprise for sharp observer.

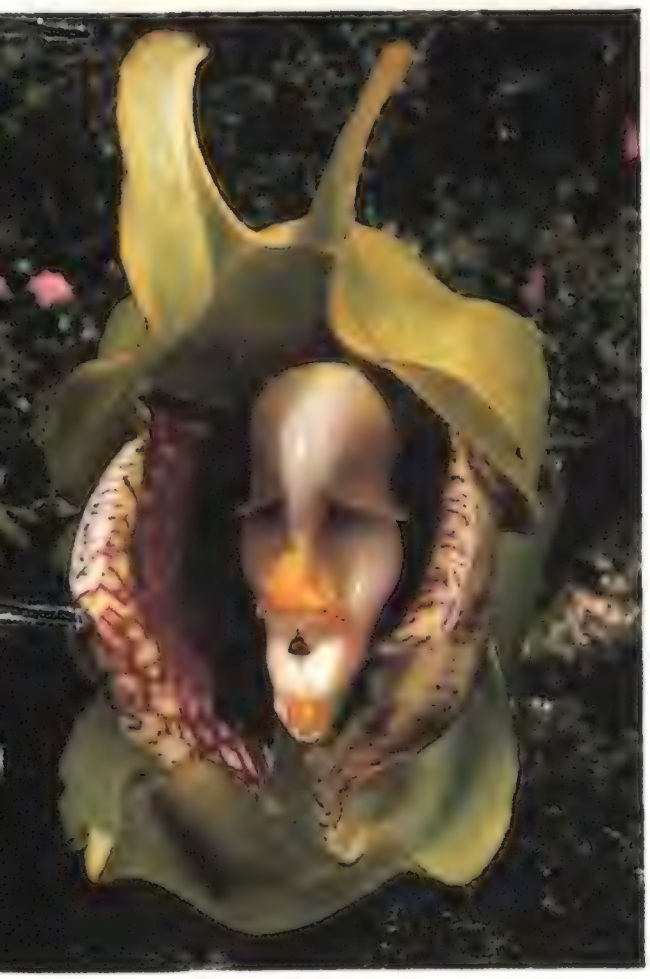
Special lighting on a twig transformed the shadow of a scar into a mouth.

Cymbidium lancifolium, with its you-name-it face, was photographed in Java.

Jaguar's spotted fur shows a face. How expressive would your cat's coat be?

A death-head moth may be harmless but it boasts a terror on its back.

Slack-jawed but brightly colored is *Cymbidium* hybrid.



A regal orchid, *Anguloa rueckeri,* reveals its own haunting countenance.

Three fruits of the Australian *Banksia* create a wide-eyed character.

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Domestic Study Tours

The following tours are fully booked, but spaces may be available in September: **Pacific Northwest** September 17-26; **The Tetons** October 4-12; and **Philadelphia** October 6-10.

North Carolina October 6-14: Enjoy local hospitality in the historic homes of Old Salem, New Bern and Edenton.

Great Smoky Mountains October 7-14: Folklore, mountain music and an invigorating program of nature study amid lovely autumn foliage.

Chesapeake Birds October 8-15: From Chincoteague, Virginia, to Cape May, New Jersey, observe vast flocks of migratory birds.

Sapelo Island November 7-13: Camp on unspoiled beaches while studying the ecology and history of this Georgia barrier island.

Everglades November 27-December 4: Explore remote areas of this subtropical wilderness, teeming with birdlife.

Christmas at the Smithsonian December 3-5: Welcome the holidays with a gala tree-trimming party, concert and special behind-the-scenes tours.

Hawaii January 30-February 12: Camp on remote beaches and enjoy the solitude and beauty of these islands.

Baja Whale Watch February 12-20: A rare opportunity to see marine mammals at close range in their isolated habitats.

Yellowstone in Snow February 18-27: Ski across magical landscapes to observe coyotes, otter, eagles and elk.

Washington "Anytime" Weekend: An economical and convenient way to visit your choice of Smithsonian museums for two or more nights at Loew's L'Enfant Plaza or Hyatt Regency. Package includes hotel, two meals, Tourmobile ticket, and exclusive tour of Smithsonian castle. Applications and payment must be received at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

People's Republic of China 1982: New exclusive programs for travel with a Sinologist to learn about the art, ancient treasures, temples and bustling cities of this complex culture.

Oxford/Smithsonian Seminar September 10-25: Live in medieval or modern "digs," dine at high table, and enjoy the special ambience of the town and university.

Amazon Passage September 30-October 16: Fascinating scenes of dense jungle, colorful birds, villages and river life on this voyage aboard the M.S. *World Discoverer*, traveling 2,900 miles from Belém to Iquitos.

Italian Contrasts October 2-17: An extended stay in Florence, with visits to Tuscany and Umbria; or, explore Venice and the Lake District.

Seminar in Salzburg October 23-November 7: An opulent palace surrounded by mountains and lakes provides perfect setting for a study of the Baroque age or the history of opera.

Kyoto Seminar November 5-21: Live Japanese style with futon and hot baths. Field trips complement lectures on art, history, religion and language.

The Ancient World of Peru November 6-21: Visit Lima, Cuzco, Indian markets and amazing Machu Picchu.

New Zealand November 17-December 3: Relish glorious scenery on this in-depth tour; talks on natural history, the Maoris, parliament; and a home visit.

A Hike in New Zealand November 17-December 3: For the outdoors enthusiast: wildflowers, ferns, crystalline lakes and snow-capped peaks on the Milford Track, the "finest walk in the world."

The Atlantic Crossing November 26-December 11: A sailing adventure from the Canary Islands to Martinique on the square-rigged, four-masted bark *Sea Cloud*.

Christmas at Canterbury December 22-January 2: An old-fashioned Dickens Yuletide with services at Becket's cathedral, wassail, the yule log and traditional Christmas dinner. Celebrate the New Year in London.

Baroque Winter January 2-16: Opera, lavishly decorated churches, museums, castles in Vienna, Salzburg and Munich, with a special Viennese ball.

Mayan Mexico: The Yucatán Peninsula January 20-February 1 or February 10-22: Tour extraordinary Mayan ruins in the company of an archaeologist.

India Wildlife Safari February 5- March 2: Travel by elephant and jeep to observe rare species of birds and animals. Includes Katmandu and Tiger Tops, Bombay, Delhi and the Taj Mahal.

Caribbean Study Voyage February 11-20: The luxurious 317-foot, four-masted *Sea Cloud* sails through the Lesser Antilles for a study of tall ships and the area's natural and cultural history.

Thailand and Burma February 18-March 11: Explore colorful cities, remote villages, and archaeological sites in Asia's most exotic countries.

Red Sea Passage February 23-March 7: Sailing from Suez on the *Argonaut*, visit Karnak, Luxor, Valley of the Kings, Abu Simbel in Egypt and Petra in Jordan. Tour the mosques and bazaars of Cairo, the Sphinx and pyramids of Giza.

Zapotec and Mayan Mexico February 24-March 8: Study native cultures—past and present—in Oaxaca, San Cristóbal de las Casas and the Yucatán.

Write National Associates, A&I 1278 Smithsonian Institution, Washington, D.C. 20560 or call (202) 357-2477 for specific tour brochures

in Washington

Selected Studies Seminars

Enjoy the treasures of the Smithsonian in popular programs and special behind-the-scenes tours. Choose from:

Lost World of the Maya September 26-October 1: George Stuart, renowned archaeologist at the National Geographic Society and author of *The Mysterious Maya*, sheds the latest light on one of the great epics of history—the rise and fall of the brilliant Maya civilization—in illustrated lectures, decipherment workshops and tours of a famous collection.

Aircraft Restoration: How To October 3-7: The master craftsmen of the National Air and Space Museum share their many techniques in workshops at the Paul E. Garber Facility (formerly Silver Hill).

American Antique Furniture October 3-8: Connoisseurship of masterpieces, 1650-1840. Includes great collections, detection of fakes, care of antiques and tours of the Winterthur Museum and the elegant Diplomatic Rooms at the Department of State.

Tibet: Lost Horizons October 17-22: The culture, history and art of this rich civilization, along with behind-the-scenes tours of the Freer Gallery and the best private Tibetan art collection in the United States.

China: A Cultural History October 24-29: From prehistory to the enigmas of today, with emphasis on intellectual and artistic traditions and the great philosophies and religions. Includes recent films and tours of the outstanding collection of the Freer Gallery of Art.

Princes and Patriots: Flemish and Dutch Painting in the 17th Century November 14-19: Lectures and tours of the masterpieces of Rembrandt, Hals, Vermeer, Rubens, Van Dyck and other artists in the National Gallery of Art with art historian Bill Kloss.

Connoisseurship of Gems November 7-11: Nationally known gem expert and author, Benjamin Zucker, gives a comprehensive look at the sumptuous world of precious gems in lavishly illustrated lectures. Participants also become familiar with the famous gems and jewelry in the magnificent collection at the Smithsonian.

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By Ward Sinclair

You can take your barbecue regulations and burn them to a crisp, Uncle Sam

The man was writing to his government and he couldn't have been more to the point. "If some SOB shows up around here to tell me how to do my barbecue," Will Sampson wrote from Dallas, "there is going to be one less government agent!"

Strong talk, that, but there is unrest in the land—and no wonder. At the U.S. Department of Agriculture they're talking about refining the federal barbecue regulations and, Land o' Goshen, what a stew they've stirred!

Americans plainly take their barbecue very seriously. It's one thing for Uncle Sam to regulate, say, toxic widgets, but it's quite another when he pokes his nose into the barbecue pit. Dozens of barbecue fanciers bombarded USDA last spring with brusque advice: "Butt out, Uncle."

The gist of all this is that barbecue comes about as close to being a sacred cow (or pig or goat) as anything else in American cookery. It's the kind of thing that pits region against region, stirs Congressmen to oratorical flights and engenders saucy controversy over the back fence. In all likelihood this has been going on ever since prehistoric Man discovered that smoke could do wondrous things to a behemoth brisket.

USDA's bureaucrats understand that, and so for the present they're treating the issue like a prime barbecue—letting it cook slowly. But one day soon, they're going to come along with the official word and you can be sure the Will Sampsons of the world won't be overjoyed. With barbecue, you just can't satisfy everyone.

To back up a bit, Maurice Lee is the man who started this whole thing. His company in Boley, Oklahoma, manufactures a commercial cooker that uses hickory wood under pressure to produce a barbecue meat that Lee certifies to be the real McCoy.

Trouble is, one of Lee's clients in California had a run-in with the state truth-in-menu law. The kitchen police held that meat cooked in Lee's machine couldn't be called barbecue. Baloney, responded Lee, and he got California to change its position.

"But the California standard was pretty much based on the federal standard, so we decided to take on USDA while we were at it," Lee recounted. "Hardly anyone can define barbecue." He noted that even in Texas, which claims the last word on almost everything, there is indecision: different sections of the state cook different meats different ways and each is adamant that only *its* barbecue is true Texas.

The federal barbecue standard, however, applies only to meat processed and sold by commercial distributors. What you do in your backyard is still your own business. Ditto the restaurants. The idea behind the standard is that USDA wants to be certain we get "real" barbecue (meat cooked over dry heat produced by coals, in the government's view) that is properly labeled.

Well, now. Responding to Lee's challenge, USDA put out a call for public comment. The department asked for definitions, preparation methods, what fine points to look for in a finished rib, whether regional differences make any difference. With that, the cards and letters started coming.

One of the first was from Ed Jones, a Congressman from west Tennessee. He wanted to know if Secretary John R. Block intended to try to tell his, Jones', constituents how to barbecue raccoon, a popular taste treat in those parts.

Of course North Carolinians, who claim their pork barbecue is the only thing worthy of the name, had to be heard from. Congressman W. G. (Bill) Hefner was puzzled: "I'd just as soon get the Government out of the pits. There's no big secret. You get some wood and a pig and you cook it. That's the key. When they cook it, I eat it. I don't understand why they need a definition."

A lot of other people who wrote to USDA agreed with Hefner. Mrs. Dan C. Taylor of Doole, Texas, wrote, "You don't have to do it. How asinine to spend money on such a thing." Wrote Carl R. Foreman of Lowell, Indiana: "Cancel this socialistic, big-brother attempt to intercede in my choices." Martha R. Bruno of Colorado Springs took the time to send in a three-page, single-spaced dissertation along with her own sauce recipe, a concoction that didn't sound half bad.

USDA appreciated the thoughts, according to John McClung, who has to answer questions about such things. But, he said, "There's been a lot of misunderstanding—people thinking that we wanted to tell them what they could do on their own patios. That was never the intent."

Even so, McClung. On this one, we'll give the last word to a Texan, Dale Crane of Dallas, who put it this way: "Texas barbecue and beautiful, alluring women are alike in that they are diminished somehow as our understanding of them increases."

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